You all know by now that the name of our Society has changed to the American Society of Plant Biologists. To accompany the new name, we have added some new features to the newsletter (now the ASPB News) and have revamped its appearance. Take a look inside and you’ll find new columns dealing with perspectives of graduate students and industry scientists, as well as a new feature on ethical dilemmas that may confront our members. Read “Stalking the Electric Polkweed” by our very own, but mysterious, “Talos.” Roger Hangarter has contributed an article on an easy method for making time-lapse movies of plants using an inexpensive webcam. If you have ideas of cool things that can be done with plants, please let me know. Also, we are looking for additional contributors for a section on new books and a section on Web sites of interest to plant biologists. Contact me if you are interested in these latent sections or have additional ideas for enlivening your newsletter.

**Does ASPB Need a Statement on the Responsibilities of Plant Biologists?**

Once upon a time, not very long ago, plant biologists had relatively few professional entanglements in complex societal issues. Most of us worked on advancing the frontiers of knowledge in our own specialty, and real-world applications either lacked much social controversy or were so far off in the future that it was premature to fret seriously about their consequences. The identification of plant hormones is one issue that comes to my mind where scientific developments in plant physiology soon led to thorny and controversial societal issues (e.g., the development of Agent Orange defoliation programs in Vietnam, and the attendant problems with dioxin contamination).

Today, it seems like another world. Basic discoveries in plant biology can now be transferred into practical uses in a much briefer time. Partly this is due to the acceleration of basic discoveries in many areas of cellular and molecular biology and genomics, but a contributing factor is our newfound ability to introduce novel genes into plants and to modify the expression of endogenous genes through antisense or other transgenic methods. With this power, plant biotechnologists foresee that many formerly intractable problems are within reach of a solution, at least a possible solution. We foresee crops with resistance to viruses, bacteria, fungi, insects, and other agricultural pests. Crops that store well and travel better, that taste better and are more nutritious, that make more resilient fibers and stronger building materials, that can reduce soil erosion and even help clean up contaminated soils. Crops that will improve the human condition and turn a profit at the same time.

Plant biotechnology is now in the limelight. Or, perhaps “headlight” is the more appropriate word. The New York Times, National Public Radio, and television programs like 60 Minutes present sketches of plant biotechnology firms, their products, and their colorful adversaries. People dressed up as giant corn cobs role over children dressed as Monarch butterflies. “Bt” rolls off the tongue of newscasters, and Starlink corn is recognized by anyone who keeps up with current events. Research plots containing transgenic plants are targets of eco-terrorist threats, as are biotechnology centers, academic laboratories, continued on page 3
Fulbright Opportunities in the Biological Sciences

The Fulbright Scholar Program is offering 76 lecturing/research awards in the Biological Sciences for the 2002-2003 academic year. Awards for both faculty and professionals range from longer. While foreign-language skills are needed in some countries, most Fulbright lecturing assignments are in English.

Application deadlines for the 2002-2003 awards are

- May 1, 2001, for Fulbright Distinguished Chair awards in Europe, Canada, and Russia
- August 1, 2001, for Fulbright Traditional Lecturing and Research Grants worldwide

For information, visit our Web site at www.cies.org. Or contact The Council for International Exchange of Scholars, 3007 Tilden St., NW, Suite 5-L, Washington, DC 20008; telephone 202-686-7877, e-mail apprequest@cies.ile.org.

and even individual university scientists. A friend at my local yoga center rants to me about the awful things that are being done to soybeans, although she is not sure what is being done to the soybeans or even how it might be detrimental. Plant genetic engineering has gotten a bad name in some circles and is mixed up with globalization of the economy, industrialization of agriculture, World Trade Organization meetings, and anti-technology campaigns by the Green Party. Yes, plant biotechnology has become controversial, and even within our own Society, members raise questions about the wisdom of specific developments and trends.

These developments make me wonder if it is time for ASPB to adopt a statement on the responsibilities of plant biologists to the larger society that supports us. ASPB has published its official stance regarding genetically engineered plants (look at the Web site under “Hot News” or go directly to http://www.aspp.org/aspb_statement_on_genetic_modifi.htm). The editors of our journals have published statements about the responsibilities of researchers to make available clones and other materials necessary to replicate and extend the work published in Plant Physiology and the Plant Cell. Other societies like ours have adopted statements about the expectations and social responsibilities that come with being a member of their organizations. In the past couple years, I’ve heard many heated discussions about the ethical merits of various plant-based technologies, with strikingly different points of view. I foresee that these issues and controversies will be more common and perhaps more complicated in the future. Wouldn’t it be good for us to develop a statement of some guiding principles to remind us of our responsibilities to use our knowledge and discoveries about plants for the benefit of humanity? I think we should go beyond the Hippocratic Oath of “Do no harm” and affirm a view that plant biologists have an obligation to work toward the benefit of the society that educated us and gave us the resources to discover how plants work their magic.

Top 10 Revisited

In my column for the November/December 2000 issue of the newsletter, I posed the questions: What are the top 10 unsolved problems in plant physiology and development? What are the great success stories in our field? I promised to summarize the ideas I received in a later issue. Well, to date I have received a total of two replies. One person mentioned in a passing conversation that he meant to respond. So that makes three, out of nearly 6,000 members, who appear to have considered my challenge. One might draw some negative conclusions from this low reply rate. But before I do that, I want to give you another chance to reply. If you meant to reply but did not get around to it, here’s a second chance. Send me your nominations.

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OUR NEW LOOK: LET US HEAR FROM YOU!

Please tell us what YOU’D like to see in YOUR newsletter. We’d appreciate your thoughts and have suggested a few questions to jump-start your thinking. All feedback is welcome and can be e-mailed to nancyw@aspp.org. Let us hear from you!

- How useful do you find the job ads and meeting notices?
- Would you prefer that job ads and meeting announcements be posted online only and no longer included in the print publication?
- What information in the current newsletter would you like to see retained?
- What would you like to see in the newsletter that has not been covered in the past?
- Would you like to see the newsletter posted online? If so, would you still opt to receive the print newsletter in the mail?

Send your answers and suggestions to nancyw@aspp.org!
Don't miss the many special and unique events planned for the quadrennial joint annual meetings of the American Society of Plant Biologists (formerly the American Society of Plant Physiologists) and the Canadian Society of Plant Physiologists. All of the scientific program and exhibits, and most of the social and networking events, will be held in the Rhode Island Convention Center, located in Providence.

The Scientific Program and Exhibits will include
- Six major symposia focused on leading topics, including a special President's Symposium on "Gene Silencing," organized by Daniel Cosgrove, and a special Plant Physiology 75th Anniversary Symposium titled "2000 and Beyond: Breaking the Mold," organized by Natasha Raikhel
- Eighteen minisymposia exploring Plant Biology's "Hot Topics"
- 1,000+ posters: Full Sunday afternoon session and Monday evening "Posters & Beer" session
- Education, Careers, and Public Affairs workshops
- Minority Affairs Committee-sponsored luncheon featuring Professor C. S. Prakash, Tuskegee University
- Committee on the Status of Women in Plant Physiology-sponsored luncheon featuring Dr. Nancy Hopkins, Massachusetts Institute of Technology
- Plant Biology Job Fair & Placement Service—View job opportunities and make contacts!
- Meet exhibiting vendors and learn about the most recent publications, services, techniques, and equipment

Network with old friends and new acquaintances at Plant Biology 2001's Special Events:
- Undergraduate Networking Pre-Mixer and Poster session—prior to Opening Night Mixer—Saturday, July 21
- Opening Night Mixer/Reception—at the Rhode Island Convention Center—Saturday, July 21
- Plant Runner's Stampede 5k and 10k Fun Run at a convenient Providence location—Tuesday, July 24
- "Rhode Island Clambake" & Dance at Providence's Station Park—Tuesday, July 24

Providence has undergone a multi-million-dollar facelift that began in the early 1980s. Centered around the city's maritime heritage, Providence's downtown revitalization has focused on the waterfront. Rivers have been rerouted to reveal waterways edged by beautifully landscaped riverwalks. Venetian-style bridges now connect downtown Providence to the College Hill and historic East Side areas. The result is a thriving Renaissance city in the heart of New England.

The Rhode Island Convention Center is beautiful, modern, and perfectly sized for Plant Biology 2001. All four hotels in our convention room block—the Westin, Biltmore, Courtyard by Marriott, and Holiday Inn—are within two blocks of the Convention Center. The Westin is the headquarters hotel and connected via enclosed walkways to both the convention Center and the new Providence Mall. Inexpensive dorm rooms have been reserved for students and postdocs at Brown University. Dining opportunities are plentiful in Providence. Choose from homemade pasta in Providence's Little Italy on Federal Hill, or dine on the many varieties of fresh New England seafood. Unique and cozy restaurants, cafes, and brew pubs abound nearby the Convention Center and hotels. And before or after the conference, be sure to take the opportunity to explore many of New England's other treasures only a short distance away—Newport, Cape Cod, Boston, Mystic Seaport, and more! See you in Providence in July!

- Discounted hotel rooms, airfares, and rental cars have been specially negotiated for Plant Biology 2001 attendees.
- A child care subsidy of up to $200 per child is available to Plant Biology 2001 attendees.
- An Internet Café will be available for attendees to keep up with their e-mail.
The Bioethics Imperative

"Mokita": The truth we all know and agree not to talk about. Papua New Guinea.

Scenario: Your postdoc is angry about his position as second author on a paper. He thinks he should be first author. Unbeknownst to you, he begins to bad-mouth the lab and you in your department and at national meetings. You hear from colleagues that other postdocs are now hesitant to come to your lab.

"Why is it imperative that I have experience dealing with bioethics? I don’t even know what they are!" This was the conversation in my head as the staff member representing the dean of the medical school asked me to lead a series of discussions on bioethics. What was I going to do, turn down the dean?!

In this column I will try to tell you why, two years later, I am ever so glad that I said yes. Rather than presume to teach you about bioethics, I will use this column to provide resources and share some of the amazing learning, events, and conversations that have ensued from my participation in this series.

Mandated and funded by the National Institutes of Health, The Bioethics Research Initiative (BRI) at the University of Washington (UW) is a series of lectures and small group discussions centered on a variety of topics from authorship to the use of human subjects in research. The lectures are videotaped, and lunch is served at each of the discussion groups run by selected faculty. Every postdoc or student funded by NIH at UW must attend three lectures and three to five of the discussion groups.

To educate its faculty, UW hands out four brief documents of two to four pages each. These give very helpful suggestions about how to lead a discussion, how to use the case studies (like the one I made up at the top of this session) to incite a discussion of bioethical issues, The Hastings Center model for helping a group reach an ethical decision, and "Ethics: A Primer for Non-Ethicists" (The Genetic Resource, 10(1):5–8). Until UW posts the materials they have developed (June 2001), materials I refer to in this column will be temporarily posted on the ASPB Web site at http://www.aspp.org/public_affairs/more_plant_information.htm.

So I read the material, which was blessedly short and actually interesting. My first session was on mentoring. We introduced ourselves and began to discuss the first case, which involved a conflict between a principal investigator who wanted a student to work during the day and a student who preferred to work at night.

"Dan, what did your group discuss?"

"Well, a similar situation actually happened in my department so we talked about that."

"How was the issue resolved?"

"The student committed suicide."

To be continued... 

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An Industrial View of Plant Biology Research

This is an exciting time for plant biologists in industry. The commercial success of transgenic herbicide- and insecticide-resistant crops has encouraged plant biotechnology companies to invest heavily in plant biology research. This investment ranges from the use of remote sensing methodology to the integration of genomic tools.

Nowhere is this endeavor more apparent than in the area of plant genomics. Technology improvements have led to massively parallel approaches in gene sequencing, mapping, expression profiling, mutant generation, and analyses. For example, all major companies have extensive EST collections for their primary crop plants. For bench-top scientists these collections save an immeasurable amount of time, since the acquisition of a described gene is now often just a matter of searching an electronic database and requesting the DNA from a centralized facility. Companies have also invested in multiple functional genomic tools, ranging from gene knockout systems to various gene expression profiling platforms. In industry, these tools are particularly important because most traits of agricultural importance are complex, resulting from the interaction of thousands of genes with the environment.

One of the primary features of these new genomic tools is the change in scale they provide. Instead of measuring alterations in gene expression of one or even several genes at a time, one can now simultaneously examine thousands of genes for changes in expression. This enhancement in scale not only increases throughput, but also creates novel approaches to both basic and applied questions. For instance, it is now possible to cluster gene

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expression profiles across experiments and reclassify known genes or functionally annotate previously undescribed genes. Beyond just the improvement in our basic knowledge, these tools and results from them are fundamentally changing the nature of problems we can address in plant biology.

I have been asked about what kinds of jobs are needed in industry. There is a continuous need for skilled, bench-top molecular biologists; however, currently one of the biggest demands is in the area of bioinformatics. In particular, there is a call for individuals who can work not only within the computational side of bioinformatics, but who also understand basic plant biology. Conversely, there is also a need for whole plant biologists, those who have a "feeling for the organism." As we test transgenic events that are efficacious in the greenhouse but ineffective when grown in the field, there is a need for scientists who know how plants grow and how they respond in varying environments. Of course, these individuals, like everyone else in industrial plant research, must be conversant in the language of molecular biology.

Unlike the requirements of academia, industry puts a high premium on hiring people who can work within an interdisciplinary environment. In my particular group at Pioneer, we have scientists ranging in expertise from genetics to molecular biology to whole plant physiology. Given the complexity of the problems and the very nature of creating products useful to society, there is little opportunity for individuals to build large, insular groups. Technology has been one of the significant drivers in the evolution of this organizational approach, and gene expression profiling is one example. We have developed and conducted multiple profiling experiments, and it has taken the concerted effort of physiologists, molecular biologists, statisticians, and bioinformaticists to generate repeatable, believable data. In addition to the immediate research group that I am part of, I also work within a product goal team. This team includes plant breeders, agronomists, physiologists, and molecular biologists, all working to apply acquired knowledge directly to product development. With this diverse group it can be challenging at times to communicate effectively and appreciate different viewpoints. However, it is implicitly understood that the best, and perhaps only, way to make progress is for each individual to contribute toward the group’s goals by participating in the design and execution of experiments. When this happens, the multidisciplinary approach has proven to be quite productive.

Companies have realized that to meet goals, they must employ creative scientists and provide them with tools to develop and use cutting-edge technology. In the past, for industrial scientists to be promoted, they often had to effectively abandon their science career and advance through the business side of a company. However, it is now being recognized that to retain experienced scientists within research programs, a different kind of advancement system is needed. For example, at Pioneer, a two-track promotion system is now in place that offers not only advancement through a business track, but also progression via a research track, rewarding scientific merit.

Industrial research effort in plant biotechnology has significantly expanded in the past decade. Evolving technologies have driven much of this expansion, and it is clear that by merging use of these new tools with more established methodologies, researchers now have an unparalleled opportunity to develop a broader approach to learning about and improving crop performance.

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Cool Things to Do with Plants

Time-Lapse Movies the Inexpensive Way

With few exceptions, plants move and grow too slowly for instructive real-time observations. As a consequence, many people view plants as inanimate objects rather than living things. This bias is hard to overcome and makes it especially difficult to interest students and young children in the plant sciences. However, show someone a time-lapse movie of a plant, and they usually can’t help becoming interested. Of course, time-lapse analyses are also of great research value, since they reveal processes that may otherwise have been inferted, often incorrectly, from static observations. The potential impact of time-lapse movies of plants is attested to in the following quote from someone who reviewed The Private Life of Plants by David Attenborough: “I never imagined that these videos would forever change the way I view plants, their relationship with animals, or our place in the world. Thus, in addition to being a powerful research tool, time-lapse movies can be effective teaching tools that can “forever change” the way students view and think about plants.

Fortunately, digital imaging technology has made it possible for nearly anyone to make time-lapse movies easily and cheaply. Many of the inexpensive “webcams” can readily be used for time-lapse imaging at the level of whole plants. Moreover, many of the webcams are able to focus as close as one centimeter, providing enough magnification to film small seedlings like Arabidopsis. Such webcams can be obtained through online
resellers for under $100. A computer is also needed, but since most schools already have them, to become time-lapse-ready requires little additional expense. Although more expensive cameras with higher resolution and better optics are available, with a little practice the inexpensive webcams can be effectively used to produce time-lapse movies suitable for instructional purposes.

Our experience has been with the Color QuickCam® camera, currently manufactured by Logitech. However, most other webcams should also work reasonably well. The basic software provided with the QuickCam® includes time-lapse capabilities, as does the software provided with many of the other webcams. In addition, various freeware and shareware programs are available that can provide time-lapse functions that will work for just about all webcams. For example, the free imaging program, NIH Image, works fine with most webcams, at least on Macintosh computers. It is also possible to modify webcams to work with infrared irradiation (easily and cheaply provided from inexpensive IR-LEDs), thus allowing one to “watch” plants while they are in physiological “darkness.” The low cost of the webcams makes them particularly well suited for use in teaching laboratories, where they can be used to study tropisms, circadian rhythms, and other plant growth processes.

With an inexpensive webcam and a computer, making time-lapse movies is easy, requiring little hands-on time. Basically, aim the webcam at the plant or whatever part of the plant you’re interested in, focus, activate the time-lapse software, and wait. Of course, it will help to do a little background work with the plant of interest to determine what time interval will be best for capturing the process of interest. Using Arabidopsis as an example, 10-minute intervals will work well for a movie of hypocotyl phototropism in seedlings, whereas four-hour intervals may be better suited for a movie of rosette growth. It is also helpful to set up the camera so that the plant or plant part will remain in the field of view for the duration of the movie. It may be useful to anticipate changes in lighting requirements as might happen when imaging the opening of a white flower. Thus, some preliminary observations are beneficial. However, since digital images are essentially free once you have the necessary hardware, mistakes are not costly. In general, with a little experience it is quite easy to make interesting movies that are informative and that inspire students to take an interest in plants as living things.

We have developed a Web site that contains a collection of digital time-lapse movies (most made with a QuickCam®) of various aspects of plant development (select the “Plants-In-Motion” link at http://sunflower.bio.indiana.edu/~rhangart/). The site contains movies of tropisms, leaf movements, flowers opening, and various growth processes in Arabidopsis and other plants. In addition to serving as a source of time-lapse movies for teaching, the site contains information for modifying a Color QuickCam® for use with IR irradiation and some basic information for making time-lapse movies that should apply to the use of other webcams. Links to some other sites that have plant-related time-lapse movies are also included.

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Who Will Be the Plant Physiologists of the Future?

The final presentation during last year’s annual meeting in San Diego was hard to beat. After explaining how plant research has benefited society and how it may do so in the future, Professor Bob Goldberg challenged the audience with the question, “Who will be the plant physiologists of the future?” No matter what answers you will give, many of the future’s plant physiologists are probably graduate students now. How their perspectives on broad scientific and social issues take form will largely determine the qualities of tomorrow’s plant physiologists. For example, the opinions we are now forming on the social and ethical impacts of genetically modified crops will undoubtedly have an important effect on the nature of future research.

Unfortunately, not enough attention is given in the Society to graduate students, considering that we are an important component of the current and future membership. It is not uncommon to see a professor’s opinion printed in these pages, but rare to read one from a graduate student. What could ASPB do differently to make the Society more relevant to graduate students? My hope is that we will use this column to give voice to the thoughts and concerns of graduate students. Perhaps ideas about how the Society could be made more important or relevant to grad students will emerge if we make this column

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Stalking the Electric Pokeweed

by Talos

I am an easy mark for any peddler who rings my doorbell with a magazine subscription to sell, but a few weeks ago when my scurfy cat induced a magazine avalanche of no small dimensions, I decided that the time had come to act. I resolved that beginning the next day I would begin to read through these back issues. True to my word, the next morning I randomly grabbed a back issue—the June 2, 1877, issue of *Scientific American* as it turns out—and began to read. There, I was treated to a brief description of a miraculous plant, dubbed *Phytolacca electrica* by its discoverer, the explorer Paul Levy. I reproduce here in its entirety a translation of a slightly more detailed description of this Nicaraguan plant, published in the *Hamburger Garten-und Blumenzeitung* (vol. 33, 29, 1877):

“The curious fact about this plant is its strongly marked electromagnetic properties. On breaking off a twig, a sensation is produced in the hand like that given off by a Ruhmkorff induction coil. The sensation was so marked that I began to experiment with a small compass. The compass began to be affected by it at a distance of seven or eight paces. The needle vibrated on approaching nearer to it, and finally began to revolve rapidly. On receding, the phenomena were repeated in reverse order. In the soil where this plant grew, there was not a trace of iron or other magnetic metal like nickel or cobalt, and there is no doubt that the plant itself possesses these peculiar properties. The strength of the phenomena varied with the time of day. During the night it is almost nothing, and reaches its maximum about 2 p.m. When the weather is stormy the energy increases still more, and when it rains the plant appears withered. I never saw any insects or birds on or about this plant.”

Yes, I am generally given to believing one impossible thing before breakfast, but this was too much. At first, I thought that Levy may have been a charlatan or mad with fever when he wrote this report, but his single account on the electric pokeweed was the only extravagant claim of his career and his approach to this anomaly was rational and scientific. After a few moments more reflection, however, I thought of a more likely explanation and immediately fired off an e-mail to *Scientific American* that the editors declined to print, claiming that the matter was no longer topical! In that letter I pointed out that under an electric field, a discharge current flows upward from the (positive) earth through trees and other pointed objects. When accompanied by light and a crackling sound, this current is called St. Elmo’s Fire. According to Schonland (1950) in his *The Flight of Thunderbolts*, “a less obvious, because invisible and silent, form of discharge is taking place all the time a thundercloud is active above the earth. Each projecting point, bush or tree, or building is silently discharging electricity upwards in the form of ions, like an earthed rod... Some years ago the author cut down a small thorn-tree... and mounted it on insulators... Measurements were made of the current passed upwards during thunderstorms when the tree was connected to the earth through a micro-ammeter. When it was not so connected it charged up like a Franklin Rod and gave most unpleasant sparks if touched by hand.” Perhaps Levy’s specimen of *Phytolacca* was growing in a burst bubble of volcanic glass and, thus, insulated enough to charge up like a Franklin Rod. The fact that Levy’s plant purportedly caused the magnetic compass not just to align itself with the plant but to spin is peculiar indeed. Such anomalous magnetic behavior, however, has been noticed before in areas of active seismic activity and may arise from a number of causes including erratic magnetic fields arising from the release of ionized gases or piezoelectric effects. Thus, Talos does not regard Levy’s *Phytolacca electrica* to be a species distinct from other known members of its genus in Nicaragua. The specimen observed by Levy was unusual only in its location in space and time. To be sure, however, Talos is seeking graduate students to climb down into active volcanoes to measure the electrical currents in plants.
Eight students have been awarded American Society of Plant Biologists Undergraduate Research Fellowships to conduct independent investigations with ASPB mentors. The following students were selected:

**Alison Eggert**, Purdue University Department of Agronomy, West Lafayette, Indiana (Dr. Daniel Szymanski, mentor). “Localization and Identification of the DIS1 Gene in Arabidopsis.”

**Abbie Grosselink**, Calvin College Department of Biology, Grand Rapids, Michigan (Dr. David Koetje, mentor). “Protease Activity of jrp1 in Response to Methyl Jasmonate.”

**Nathaniel Jeanson**, University of Wisconsin Department of Biological Sciences, Parkside (Dr. David Higgs, mentor). “Chloroplast mRNA Stability and Translation.”

**Del Lucent**, Wilkes University Department of Biology, Wilkes-Barre, Pennsylvania (Dr. William Terzaghi, mentor). “The Effect of Mitochondrial Membrane Lipid Composition on Respiration in Arabidopsis.”

**Amy Rettler**, University of Wisconsin Department of Plant Pathology, Madison (Dr. Andrew Bent, mentor). “Elucidating the Role of HR and SA-, JA- and Ethylene-Mediated Disease Resistance through dnd Mutants.”

**Stephen Schilling**, Dartmouth College Department of Biological Sciences, Hanover, New Hampshire (Dr. C. Robertson McClung, mentor). “Characterization and Mapping of Two Photoperception Mutants in Arabidopsis thaliana.”

**Ilena Silva**, Rice University Department of Biochemistry and Cell Biology, Houston, Texas (Dr. Bonnie Bartel, mentor). “Genetic Analysis of IBA Metabolism in the Plant Arabidopsis thaliana.”

**John Sneddon**, University of Nebraska Department of Biochemistry, Lincoln (Dr. Lori Allison, mentor). “The Expression of Nuclear-Encoded Maize Sigma Factors 2a and 6 in Tobacco Plastids.”

In addition to the students selected for fellowships, the following students were noted for honorable mention:

**Laura Black**, University of Massachusetts Department of Biology, Boston (Dr. Adán Colón-Carmona, mentor). “Identifying Photoreceptors Responsible for Cell Division Activation in Arabidopsis thaliana.”

**Jeffrey Butler**, Virginia Tech Department of Biochemistry, Blacksburg (Dr. Glenda Gillaspy, mentor). “Substrate Specificity of Putative ATPase in Arabidopsis thaliana.”

**Merici Evans**, Edgewood College Department of Natural Science, Madison, Wisconsin (Dr. Sharon Thoma, mentor). “Cloning and Sequencing of the Polyphenol Oxidase Gene(s) in Alfalfa.”

**Tracey Millard**, Michigan State University Department of Energy Plant Research Laboratory, East Lansing (Dr. Pam Green, mentor). “Investigating the Biological Role of RNS1 in Arabidopsis thaliana.”

**Kristy Wilson**, University of South Dakota Department of Biology, Vermillion (Dr. Zoran Ristic, mentor). “Chloroplast Protein Synthesis Elongation Factor and Heat Tolerance in a Maize EF-Tu Mutant.”

**Jeffrey Wright**, California State University Department of Biological Sciences, Long Beach (Dr. Judy Brusslan, mentor). “Identification of the ceh2 Gene via TAIL-PCR.”

This is the inaugural year for the program. The goal is to provide opportunities for students to pursue meaningful research in plant biology at their home institutions early in their college years. The program targets students who have just completed their sophomore year of undergraduate studies. But exceptionally well-prepared students who have just completed their first year are also considered, as are students who have completed their junior year and provide evidence of a strong commitment to plant biology. Recipients are expected to present their results at the ASPB annual meeting the following summer (with funding provided by ASPB travel grants). With such an opportunity, ASPB hopes to encourage students to pursue careers and advanced degrees in plant biology.

The fellowships provide a $3,000 stipend, $500 for supplies, and a one-year membership in ASPB. There were a total of 53 applicants, 35 from Group A institutions (doctoral universities) and 18 from Group B institutions (non-doctoral universities and colleges). A total of eight awards were made, five from group A and three from group B. Additional information about the ASPB–URF Program can be found at [http://www.aspp.org/hot_news/urf_announce.htm](http://www.aspp.org/hot_news/urf_announce.htm). The deadline for applications for the next round of ASPB–URFs will be March 1, 2002.

Look for posters from this group of budding plant biologists at Plant Biology 2002 in Denver, Colorado!
Journals Announce Best Paper Award Winners

The editors of Plant Physiology and The Plant Cell have selected the winners of their first annual Best Paper Award. Thomas Girke has won for his article in the December 2000 issue of Plant Physiology, and Henri Batoko for his paper in the December 2000 issue of The Plant Cell. Both authors will receive a $1,000 cash prize and a subsidy of up to $1,500 to attend Plant Biology 2001 in Providence, Rhode Island, July 21-25.

Thomas Girke, a researcher at Dow AgroSciences, won for research he performed while a postdoctoral fellow in the laboratory of John Ohlrogge at Michigan State University. The purpose of his research initiative was to elucidate which genes in the Arabidopsis genome are expressed in seeds. Girke et al.'s (2000) work goes a long way toward filling the gaps in our knowledge concerning the molecular biology of Arabidopsis seeds. He and his colleagues provide many fascinating insights concerning metabolic routes for the conversion of photosynthetic into oil in developing Arabidopsis seeds.

Dr. Girke will give a 30-minute presentation during the Functional Genomics minisymposium on July 25.

Henri Batoko is currently a postdoc in Ian Moore's laboratory in the Department of Plant Sciences, Oxford University. His professional interest is the regulation of protein trafficking in plant cells. He and his coauthors (2000) conclude in their article that AtRab1b function is required for transport from the endoplasmic reticulum to the Golgi apparatus and suggest that this process may be coupled to the control of the Golgi movement.

AspB Sponsors AIBS Exhibit

ASPB sponsored an exhibit at the 52nd annual meeting of the American Institute of Biological Sciences (AIBS) in Arlington, Virginia, on March 24–26, 2001.

The conference was organized around the theme “From Biodiversity to Biocomplexity.” The new format provides a more intimate and smaller format of discussions for attendees with researchers and educators in the biology field. Some 300 teachers, scientists, and investigators attended the meeting from all over the United States, traveling from as far away as Hawaii.

Attendees told ASPB staff working at the Society’s booth that they were very interested in the March special issue of Plant Physiology on The Grasses; The Plant Cell and Plant Physiology posters; and the Society’s new textbook, Biochemistry & Molecular Biology of Plants, by Buchanan, Grissen, and Jones. The brochures about plant science studies were also a big hit, generating huge interest among educators.

Adele Kupfer, director of Project-STIR (Science Teachers in Industry and Research), inquired about additional ASPB educational materials for an upcoming teacher’s workshop for New York City high school science teachers. “The high school students will benefit greatly from any learning materials you have available to donate,” said Kupfer. Project-STIR responds to the needs of metropolitan New York City urban and inner-city schools to obtain up-to-date science equipment and supplies, encouraging a hands-on atmosphere in high school science classes. ASPB donated books, posters, bookmarks, copies of Principles of Plant Biology—Concepts for Science Education, and additional educational materials for the conference.

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**People**

**Victor Raboy**

**Nutritious Pollution-Fighting Corn Wins Honor for Idaho Scientist**

For developing new kinds of corn that help people, animals, and the environment, U.S. Department of Agriculture researcher Victor Raboy of Aberdeen, Idaho, has won a national technology-transfer award.

A research geneticist with USDA’s Agricultural Research Service (ARS), Raboy was honored by the ARS Office of Technology Transfer for developing a patented technique that yields corn and other grains with a lower amount of a compound called phytate.

“Phytate interferes with the ability of some animals to absorb phosphorus,” explained ARS administrator Floyd P. Horn.

“Dr. Raboy’s unique, low-phytate grains increase the amount of phosphorus that pigs, poultry, and fish can absorb from grain-based feed. That reduces phosphorus loads in their manure and helps minimize leaching and pollution.” Phosphorus pollution is thought to play a role in algal blooms and fish kills.

“In addition,” Horn noted, “Dr. Raboy’s low-phytate grains may battle iron-deficiency anemia in humans by making iron, an essential mineral, more available to our bodies. We’ve already seen that happen in preliminary studies with volunteers who ate tortillas made with flour from the low-phytate corn.”

Raboy was commended at an awards ceremony held recently at the ARS Henry A. Wallace Beltsville Agricultural Research Center in Beltsville, Maryland. Raboy has been with the ARS since 1987, working first in Bozeman, Montana, then transferring to Aberdeen in 1997.

He earned his bachelor of science degree in plant and soil science from the University of Massachusetts in 1978, a master of science in horticulture in 1980 from the University of Illinois, and his doctorate in horticulture in 1984, also from the University of Illinois.

**Maria Elena Zavala**

**CSUN Biology Professor Chosen for Excellence Award**

Cal State Northridge biology professor and ASPB member Maria Elena Zavala has been chosen to receive a Wang Family Excellence Award from the California State University system for her outstanding work with students.

Zavala is one of five award recipients this year from the 23-campus Cal State system. She will be presented with the award, which includes a $20,000 payment, during the CSU Board of Trustees meeting May 15-16, 2001, in Long Beach.

“Dr. Zavala’s important contributions to the fields of botany and cell biology, her commitment to her students, and her mentoring of minority students and teachers have made her an exemplary member of our faculty,” said CSUN President Jolene Koester.

A plant biologist who has taught at CSUN since 1988, Zavala said she is honored to be chosen for the award. “But really, it is the students who deserve the recognition. I just try to give them an opportunity, and they are the ones who take advantage of it,” she said. “It’s like planting trees. You can’t make an elm into a pine tree. But you can shape a pine tree into the best tree it can be. I try to provide the students an environment where they can do well.”

The CSU award was established in 1998 when CSU trustee Stanley T. Wang gave the Cal State system a $1 million gift—the largest donation to the CSU system by an individual—to reward outstanding service. The annual awards “celebrate those CSU faculty and administrators who through extraordinary commitment and dedication have distinguished themselves by exemplary contributions and achievements in their academic disciplines and areas of assignment.”

Among her varied honors, Zavala last September received White House recognition for helping build the CSUN Biology Department’s Minority Access to Research Careers (MARC) and Minority Biomedical Research Support (MBRS) programs. She received the National Science Foundation’s 2000 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring.

Those two CSUN programs involving Zavala, and a new one called Bridges to the Ph.D., have received more than $2 million in grant funding since 1999. Zavala also was honored with CSUN’s 2000 Award for Outstanding Achievement in Equity and Diversity. Off-campus, she was elected president of the Society for the Advancement of Chicanos and Native Americans in Science.
Zavala has mentored more than 125 minority science students at CSUN since 1993. Those students have succeeded with completion rates exceeding 90 percent and have been nine times more likely to advance to Ph.D. programs. Zavala received her undergraduate degree from Pomona College and her doctorate from the University of California at Berkeley.

**Indra K. Vasil**

**University of Florida and Monsanto Honor ASPB Member Indra K. Vasil**

The University of Florida and the Monsanto Company have established an endowed professorship, the Vasil-Monsanto professorship, in honor of Indra K. Vasil, who recently retired from the University of Florida after 32 years. Mark Settles, who works on the functional genomics of maize (endosperm mutants) in Rob Martienssen’s lab at Cold Spring Harbor Laboratory, has been appointed the first Vasil-Monsanto professor. Vasil, known for his work on the molecular biology and biotechnology of cereals, continues as a graduate research professor emeritus (ikv@mail.ifas.ufl.edu) at the University of Florida. As president of the International Association for Plant Tissue Culture & Biotechnology (IAPTC&B), he currently is directing most of his effort toward the organization of the 10th IAPTC&B Congress—Plant Biotechnology 2002 and Beyond (www.hos.ufl.edu/iaptcpb), to be held June 23-28, 2002, in Orlando, Florida.

**Southern Section**

The Southern Section of ASPB met over the weekend of March 24-26 in Raleigh, North Carolina. A total of 27 talks/posters were presented to the 68 people in attendance. Two awards were presented to graduate students for outstanding oral presentations: Jason Sterling (Department of Biochemistry and Molecular Biology, Complex Carbohydrate Research Center, The University of Georgia) and Michael J. Wheeler (Department of Biology, Louisiana State University–Shreveport). An award was also presented to Robin Gaines (Department of Biology, East Carolina University, Greenville) for the best undergraduate poster presentation.

This year’s annual symposium addressed “Components Involved with Plant Cell Wall Architecture and Integrity: Effects of Abiotic and Biotic Stress.” Presentations included Dr. Debra Mohnen (Complex Carbohydrate Research Center, University of Georgia), “Pectin Biosynthesis and Function”; Dr. Andrew Mort (Oklahoma State University), “Pectin Structure and Function in Sickness and in Health”; and Dr. Ronald Sederoff (North Carolina State University), “Genomic Approach to Wood Formation in Loblolly Pine.”

Gifts from Philip Morris, Pioneer Hi-Bred International, North Carolina Biotechnology Center, and ASPB helped make these meetings possible. The Southern Section greatly appreciates the generosity of these organizations.

**Wilhelm Pfeffer Book Available Free from ASPB**

ASPB has received 50 copies of Ahead of His Time: Wilhelm Pfeffer, Early Advances in Plant Biology, to distribute free of charge. Written by Erwin Bunning and translated by Helmut William Pfeffer, this 150-page book, originally published in English by Carleton University Press (now part of McGill–Queen’s University Press), conveys Bunning’s impression of Pfeffer the man, the teacher, the writer, and the experimental biologist. Some 110 years ago, Pfeffer postulated the structure and functions of the plasma membrane and expressed the opinion that all physiological properties of higher organisms depend on cell functions that are already present in single-celled organisms.

Interested readers should contact the publications director at nancyw@aspp.org.
As we enter the new millennium, the age of genomics is in full swing. Much more than the study of individual genes and their functions, genomics implies the study of the interacting networks of genes, proteins, and metabolites that make up a whole organism. Large-scale genome sequencing projects form the base of all genomics studies, but radiating out from this base is a host of other tools that allow us to figure out the biology that is governed by DNA sequence.

Between September 1999 and January 2001, *The Plant Cell* published a series of articles on genomics technologies and approaches specially written for the plant science community. These articles, together with a number of research papers on plant genomics published during this period, have been bound into a volume called *Plant Genomics: Emerging Tools*. This compilation provides readers interested in the applications of genomics to plant science with a single resource covering the most recent developments in this emerging field.
Senators Christopher Bond (R-MO) and Barbara Mikulski (D-MD) are leading efforts to increase funding for the National Science Foundation (NSF), Department of Energy (DOE), and National Aeronautics and Space Administration (NASA) well above the administration’s budget request.

Bond and Mikulski recently won support by the Senate for their amendment to the budget resolution that would increase research funds for all three agencies, including a 15.3 percent increase for NSF. An increase at or near 15.3 percent in fiscal year 2002 would continue NSF on a doubling path over five years that Bond initiated for NSF in fiscal year 2001. (Under the mathematical rule of 72, divide 72 by the number of years [five] to get the average percentage increase needed each year for a doubling [14.4 percent].) Senators joining Bond and Mikulski in offering the successful amendment were George Allen (R-VA), Joseph Lieberman (D-CT), and Jeff Bingaman (D-NM).

In offering the amendment April 5, Bond explained that it would increase support over FY2001 by $674 million for NSF; $469 million for DOE’s science accounts; and $518 million for NASA. Combined, these increases would add $1.44 billion to the administration’s FY2002 budget request for research.

In addition to offering the successful amendment to the budget resolution, Bond and Mikulski are leading a campaign to secure the sign-on by other senators to a letter urging the Senate leadership to join in continuing a five-year goal of doubling the budget for NSF by FY2005. ASPB Campus Contacts and their colleagues have been supporting this effort. Following is the text of the Bond–Mikulski letter seeking a doubling of the NSF budget:

March 12, 2001

Dear Colleague:

Last year, 41 senators agreed to co-sign a letter to Majority Leader Lott and Democratic Leader Daschle proposing that the budget of the National Science Foundation (NSF) should be doubled over a five-year period. In the fiscal year 2001 appropriation, this important agency received a significant increase that could start it down the road toward doubling its budget.

We continue to believe that investing in basic research should be a cornerstone of our strategy for economic growth, a better-educated workforce, technological leadership, improved public health, prevention of disease, and national security. As the only federal agency whose primary mission is to support fundamental scientific research, NSF is best positioned to advance this strategy. For these reasons, we are asking once again for your signature on the enclosed letter to the Senate leaders.

To sign the letter, or if there are any questions, please contact Cheh Kim of Senator Bond’s staff . . . or Paul Carlmer of Senator Mikulski’s staff . . .

Thank you for considering this.

Sincerely,

Christopher S. “Kit” Bond, U.S. Senator
Barbara A. Mikulski, U.S. Senator

LETTER TO BE COSIGNED

Dear Majority Leader Lott and Democratic Leader Daschle:

We are writing as longtime supporters of investments in fundamental research and education—the building blocks of the new economy. Just as we have worked collectively to double the National Institutes of Health (NIH) budget over five years, we believe that we must continue a parallel effort to double the budget of the National Science Foundation (NSF) over five years. It is our strong belief that the success of NIH’s efforts to cure deadly diseases such as cancer depends heavily on the underpinning research supported by NSF. The NSF supports fundamental research that contributes to the nation’s health and well-being. In the fiscal year 2001 appropriation, the Congress provided this crucial agency with the largest budget increase in its history, which put the agency on the path of doubling its budget in five years.

As the Council on Competitiveness has noted: “For the past 50 years, most, if not all, of the technological advances have been directly or indirectly linked to improvements in fundamental understanding.” Business Week adds: “What’s needed is a serious stimulus to basic research, which has been lagging in recent years. Without continued gains in education and training and new innovations and scientific findings—the raw materials of growth in the New Economy—the technological dynamic will stall.”

NSF’s impact over the past half century has been monumental—especially in the field of medical technologies and research. The investments have also spawned not only new products, but also entire industries, such as biotechnology, Internet providers, E-commerce, and geographic information systems. Medical technologies such as magnetic resonance imaging, ultrasound, digital mammography and genomic mapping could not have occurred, and cannot now improve to the next level of proficiency, without underlying
knowledge from NSF-supported work in biology, physics, chemistry, mathematics, engineering, and computer sciences.

In 1993, NSF support made it possible to detect the cause of a deadly hantavirus outbreak in the American Southwest. NSF-supported research on plants led to the discovery of Taxol, a derivative of Yew trees that is effective against certain cancers. The benefits of NSF research to medical science and technology has been recognized by leading doctors such as the former heads of the NIH, Harold Varmus and Bernadette Healy, and the President of the Institute of Medicine, Kenneth Shine. New NSF support for research in nanotechnology, high-speed computing, plant genome research, biocomplexity, and cognitive neuroscience will further advance the state of technological change and improve our quality of life through creation of new products, a better understanding of how humans behave, and how our ecological systems can survive. Furthermore, every generation requires a group of skilled and innovative scientists and engineers to make the new discoveries that propel society into the future.

Senators may disagree about the precise mix of fiscal and monetary policies that will ensure a continuation of America's current economic prosperity. But there is a growing consensus that investing in fundamental scientific research is one of the best things we can do to keep our nation economically strong. This fact has been recognized by Federal Reserve Chairman Alan Greenspan, NASDAQ President Alfred Berkeley, the Committee for Economic Development, and many other widely respected experts. For all these reasons, we hope you will join us in continuing a five-year goal of doubling the budget of the National Science Foundation by fiscal year 2005.

Senator Bond and Mikulski were joined by Senator Mikulski last year in announcing a campaign to double the budget of the National Science Foundation. The stunning success of Bond and Mikulski in achieving an increase of 13.6 percent for NSF for fiscal year 2001 puts the agency on a course that could result in doubling its budget in just five years. The successful bipartisan efforts of the two senators on behalf of NSF resulted in the record increase of $529 million for NSF in FY2001, propelling the agency over the $4 billion mark to $4.426 billion. Without the efforts of Bond and Mikulski, the increase for NSF would have been significantly lower.

Senators Bond and Mikulski are relentlessly pursuing the doubling effort again this year while facing an ever-more constricted overall

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federal budget. Key budget committee staff have cited the continued support for NSF by Senator Bond, joined by Senator Mikulski, as crucial to hopes for higher spending levels for the agency.

In accepting the award, Senator Bond thanked the science community for its support and urged scientists to work with their members of Congress in support of a doubling of the NSF budget over five years. For many years the champion in Congress of the plant science community, Bond noted in his acceptance remarks the importance of the NSF-sponsored plant genome research program and the completion of the sequence of the Arabidopsis genome. He encouraged scientists of all disciplines to explain the importance of plant biotechnology to the public. His comments in support of plant science were one of the two major topics of his acceptance remarks. Senator Bond led successful efforts in Congress over the past four years for $230 million in additional funds for plant genome research sponsored by NSF.

In her acceptance remarks, Senator Mikulski recalled her long career in addressing science issues. She singled out current and past colleagues she has worked with in Congress who have contributed to her knowledge of science agencies, including the National Aeronautics and Space Administration (NASA). She cited her strong working relationship with Senator Bond and remarked that he “treasures” her relationship with him. Senator Mikulski is the ranking Democrat on the Appropriations Subcommittee on VA, HUD and Independent Agencies (including NSF). Senator Bond chairs this key committee. Together, with the support of the science community, they overcame many obstacles to successfully launch the first year of the five-year doubling effort for NSF in FY2001.

Administration’s Proposed Research Budget Seeks Generally Level Funding

The research budgets for the U.S. Department of Agriculture (USDA), the Department of Energy (DOE), and the National Science Foundation (NSF) are generally level with the current year in the administration’s fiscal year 2002 request. However, bipartisan efforts in Congress to bring substantial increases for research, especially at NSF, are being led by Senator Christopher Bond (R-MO). Following is a summary of portions of the administration’s proposed budget for USDA, DOE, and NSF.

**USDA**

The request for the National Research Initiative Competitive Grants Program (NRI) within the Cooperative State Research, Education and Extension Service (CSREES) is at $106 million—the same as last year. The budget request for formula funds is level with the current year at $544 million. The Initiative for Future Agriculture and Food Systems would again receive $120 million as provided by statute. Overall, CSREES-proposed funds for fiscal year 2002 are at $994 million compared to $1.138 billion for fiscal year 2001. Special grants approved for the current year by Congress but not sought by the administration make up much of the reduction in the CSREES request. However, it can be expected that Congress will put the special grants money back into the fiscal year 2002 budget in spending bills. This could put increased pressure on funds for the NRI.

The request for the Agricultural Research Service (ARS) Research and Information budget for fiscal 2002 is at $916 million, up $1 million over the current fiscal year budget. The ARS Plant Science budget line in the request goes up $20 million over the current year budget to $325 million. A priority area listed in the budget is Biotechnology, with an amount of $7.5 million in the ARS budget related to biotechnology going to “developing the underlying database and information analysis tools needed to support ARS genomics research and to assess risk associated with biotech crops. Funds will support development of databases used to store, analyze and interpret the sequencing, mapping and functional genomics data for plants, animals and microbes. Increased research on risk assessment will focus on resistance management, including preventing buildup of resistant pest populations, minimizing effects of non-target species from pest and disease tolerant transgenic plants, and decreasing allergens of biotech food products.” The ARS budget also includes $15 million for the priority area New Uses for Agricultural Products and $12 million for research on Emerging and Exotic Diseases and Pests.

**DOE**

Although funds are up $13 million in the overall DOE Basic Energy Sciences (BES) budget to nearly $1.005 billion, much of the increase goes to construction, which is up $21.4 million. A number of other programs within BES are down slightly in the proposed budget. Energy Biosciences is at $32.4 million in the proposed fiscal 2002 budget compared to $33.2 million in the current year. Materials Sciences is down $8.9 million to $434.4 million.

**NSF**

The FY2002 request for NSF is up 1.3 percent to over $4.472 billion. The request for NSF research and related activities is down 0.5 percent to $3.327 billion. The request for Education and Human Resources is up 11 percent to over $872 million. Major Research and Equipment is down 20.6 percent to $96.3
Five Plant Research Breakthroughs Among NSF’s “Nifty Fifty” Explained in Siedow’s Congressional Testimony

ASPB Committee on Public Affairs member James Siedow, vice provost for research and professor of biology (botany) at Duke University, presented testimony March 21 to the House Appropriations Subcommittee on VA, HUD and Independent Agencies seeking a doubling of support for the National Science Foundation over five years. Siedow commended that ASPB strongly supports and appreciates the efforts of this subcommittee and of Senators Kit Bond and Barbara Mikulski to double support for NSF over five years.

Siedow cited plant research breakthroughs supported by NSF that were included in the NSF Resource Guide 2000. This resource guide features “50 discoveries or advances that NSF believes have had the most impact or influence on every American’s life.” NSF calls this list the “Nifty Fifty” in honor of the agency’s anniversary. Following are major portions of the comments:

**Arabidopsis—A Plant Genome Project**

Thanks to the support of the subcommittee, NSF has been able to sponsor genomic research on the model plant *Arabidopsis thaliana*. The entire genome sequence was completed at the end of 2000, well ahead of schedule. Now that the sequence has been completed, NSF is proceeding with the 2010 Project to determine the function of every gene in this model plant. Arabidopsis is so similar to most other plants that knowledge of its comparatively simple genome will speed

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the way to discovery of genes and their functions in other flowering plants, including valuable agricultural and energy crops.

**Edible Vaccinations**

Another major discovery sponsored by NSF will lead to edible vaccinations that will be more affordable and more accessible to people worldwide. Researchers in Ithaca, New York, led by ASPB member Charles Arntzen, are genetically engineering potatoes and bananas that produce antigens for use against diarrhea caused by the E. coli bacteria. Substantial savings could result from growing green pharmaceutical plants that produce edible vaccines without the need for refrigeration, syringes, or other costly items that deny necessary care to millions of young children in the developing world who die each year from untreated diarrhea. The support of this subcommittee for NSF that has propelled plant science into the age of genomics will result in many more lifesaving medicines for people here and abroad.

**Genomics Bio-Pharming with Plants**

The third member of the Nifty Fifty, Genomics Bio-Pharming with Plants, goes beyond edible vaccines. Lactose intolerance, allergic reactions to wheat products, and other food-related ailments could become a thing of the past, NSF notes, if allergens in foods such as milk and wheat are eliminated. Plant scientists who have been supported by NSF are making great strides in this research. NSF funded ASPB member Bob Buchanan at the University of California at Berkeley for a number of years to study the protein thioredoxin in plants. Buchanan’s research addressed questions of basic plant biology with no known commercial application at the time. However, Buchanan theorized that thioredoxin, with its ability to break up disulfide bonds to help seeds germinate and also to activate photosynthesis, could also change the shape of allergen proteins containing disulfide bonds. His theory proved correct, opening the door to a promising new food technology for allergy sufferers and their families.

NSF noted that vegetables engineered with higher vitamin E content are expected to help fight heart disease. An improved strain of rice, called “golden rice,” with enhanced levels of provitamin A and iron, will help battle nutritional deficiencies in the diets of millions of people. Golden rice could have profound results in developing nations, where more than half a million children a year go blind from vitamin A deficiencies in their diet and many more people suffer from anemia due to iron deficiencies.

The bark and needles of the Pacific Yew tree have for years been a source of taxol, which is an effective pharmaceutical treatment against certain types of cancer in humans. Advances in research will allow production of much larger quantities of taxol while reducing damage or destruction to Pacific Yew trees.

**Overcoming Heavy Metals**

Up to 12 percent of soils under cultivation around the world contain metals that stunt plant growth and development and result in poor harvests. NSF-funded researchers are using genetic engineering to develop plants that flourish on metal-rich soils. Other specially selected and engineered plants will perform an environmental cleaning function by removing heavy metal contaminants from the soil and water—a process called phytoremediation. There are also some beneficial metals such as iron that are found in the soil. One-third of the world’s soils are iron-deficient. Iron deficiency is the most prevalent nutritional problem in the world today, affecting an estimated 2.7 billion people, nearly half the earth’s population. Plants are a major source of iron for most of the world’s people. Understanding how to modify plants that take up higher amounts of iron will help solve the widespread human nutritional problem of anemia.

**Overcoming Soil Toxicity**

Almost one-third of the irrigated land on earth is not suitable for growing crops because it is contaminated with high levels of salt. More farmable land is lost annually through high salt levels in soil than is gained through the clearing of forest resources.

Most plants are highly sensitive to salty conditions that cause stress and significant biochemical changes due to absorption and influx of sodium from the salty soil. NSF-funded scientists are studying approaches that will lead to plants that can tolerate salty growing conditions. By understanding the signaling system that allows a plant to sense excess sodium in the environment and then make necessary adjustments, plant biologists will be able to influence the growth of crop plants under arid conditions.

Siedow concluded by saying that “In my 31-year career in plant biology, I have never seen a more exciting time for research in the field. Plant genomics and biotechnology have revolutionized the way scientists can improve plants that provide the world’s supply of food, much of the world’s energy, industrial feedstocks, clothing and building materials, and lifesaving medicines. The basic research breakthroughs with plants made possible by this committee’s support for NSF also provide extremely valuable information to researchers sponsored by the federal mission agencies.”
ASPB, Corn Growers, and Plant Pathologists Join in Support of DOE Energy Biosciences

ASPB, representing nearly 6,000 plant scientists, was joined by the National Corn Growers Association (NCGA), representing more than 30,000 members, and the American Phytopathological Society (APS), representing 5,000 scientists, in submitting comments April 9 to the House Appropriations Subcommittee on Energy and Water Development supportive of basic plant and microbial research sponsored by the Department of Energy (DOE) Energy Biosciences program in fiscal year 2002.

The program supports basic research that makes use of the sun's energy and atmospheric carbon dioxide to produce in plants renewable sources of energy including fuels and industrial products. Promising research on plants in the area of phytoremediation sponsored by the program is leading to enhanced plants that can be used to clean heavy metal contaminants from soil and water.

The comments noted that ASPB member Chris Somerville, whose research has been supported by the Energy Biosciences program, and Dario Bonetta provided the historical background and projected future advances in energy-related plant research in the January 2001 issue of Plant Physiology. These scientists identified a number of opportunities offered by advances in plant genomics and modern transformation technologies such as biotechnology that will lead to the development of novel plant products to replace petroleum-derived chemicals. Research in this area has been identified by Plant Physiology as one of the greatest advances in plant science of the past 25 years. The DOE Energy Biosciences program is the key source of support for this basic energy research.

As recently as 1930, 30 percent of industrial organic chemicals were derived from plants. The discovery of extensive petroleum reserves and advances in chemistry and petroleum engineering resulted in a major shift to reliance on fossil sources of organic feedstocks such as petroleum.

ASPB, NCGA, and APS said opportunities offered by modern plant research are leading to home-grown genetically engineered plants that produce commercially valuable chemicals. Enhanced energy crops would help diversify crop production in the United States by producing high-value chemicals and other technical materials. These enhanced crops could create potentially large new markets for excess production of American agriculture. Plants engineered to be chemical feedstocks would also address the long-term goal of developing more sustainable and environmentally benign methods of meeting national needs for chemicals and other materials that are currently produced by chemical synthesis from declining petroleum or coal feedstocks. In addition, it is possible to envision the production in plants of novel biologically inspired materials with properties not easily simulated through chemical synthesis.

Two major factors suggest that the trend toward use of petroleum-derived products over plant-based products can be reversed. First, the costs of agricultural plant products have declined steadily over the past 75 years, whereas oil prices have generally increased. Second, through genomics and genetic engineering, we can now tap into the vast chemical diversity produced biologically. Within the plant kingdom alone, more than 50,000 different organic chemical structures are produced biologically. The microbial world provides many additional opportunities. A practical example of the possibilities offered was demonstrated by the use of a bacterial gene to modify a plant to produce a biodegradable plastic at levels up to 14 percent of the dry weight of the plant's leaves. Basic research leading to this example was made possible by the DOE Energy Biosciences program. Plant-produced products can also provide the chemical industry with much greater diversity than available from the comparatively limited structures found in crude oil.

The comments noted that the lab of Michigan State University Professor John Ohlrogge, who has been supported by the Energy Biosciences program, is now working to develop plants that will provide the feedstocks for new types of polyurethane, nylon with stronger and more flexible fibers, and biodegradable lubricants. These are not niche markets. The United States now produces nylon, polyurethane, and other plastics to supply multi-billion-dollar markets. Genetically modified crop plant production of nylon alone could create more than $2 billion in new income for American farmers. American farmers will benefit from these enhanced plants because they will have new markets for their products. The American chemical industry will benefit because it will have new structures on which to build improved plastics and other products. American consumers will benefit because more of the nation's products will be based on renewable and biodegradable resources that do not contribute to landfill overflow or higher atmospheric carbon dioxide levels. The nation would also become less dependent on foreign oil for production of these products.

ASPB, NCGA, and APS commented that the Energy Biosciences program is an example of the optimum way basic science can be used to solve some of our country's most challenging energy and environmental problems. ASPB, NCGA, and APS urged the committee to increase support for Energy Biosciences and the Office of Science by 15 percent in fiscal year 2002 to help the nation more effectively meet its enormous energy needs.

This is the first year that ASPB, NCGA, and APS have joined together to submit comments in support of the DOE Energy Biosciences program.
ASPB submitted comments April 9 to the House Appropriations Subcommittee on Agriculture supporting fiscal year 2002 appropriations for the Department of Agriculture National Research Initiative Competitive Grants Program (NRI), the Initiative for Future Agriculture and Food Systems (IFAFS), and the Agricultural Research Service (ARS).

ASPB also submitted comments supporting these important research programs to the Senate Committee on Agriculture for its consideration of the Research Title of the Farm Bill. ASPB noted that the National Research Council Board on Agriculture and Natural Resources Committee report on the NRI last year strongly endorsed support for this competitive grants program. The NRC committee “found the NRI to have financed high-quality scientific work within congressional guidelines. . . . The committee reiterates the extraordinary importance of public merit-based peer-reviewed research in food, fiber and natural resources. In the committee’s opinion, past public research and current private activities cannot meet the needs that are being created by population growth, climate change and natural resource deterioration or the challenges related to food safety and nutrition and to the growing convergence of foods and medical research.”

The NRC committee recommended that a major emphasis of the NRI continue to be the support of high-risk research with potential long-term payoffs. Much of this research would be classified as fundamental in the traditional use of this term. The NRC committee concluded that “Without a dramatically enhanced commitment to merit-based peer-reviewed, food, fiber and natural resources research, the nation places itself at risk.”

In addition to the direct benefits to farmers and consumers that result from the leading research discoveries sponsored by the NRI, increased support for the program would help maintain the strength and vigor of the nation’s agricultural research community, ASPB commented. ASPB urged the subcommittee to increase support for the NRI, including NRI-sponsored plant research to help meet the important long-term research needs of America’s farmers.

IFAFS has provided grants at levels that enable scientists of different institutions and disciplines to work together in addressing important research questions, ASPB said. The Society urged the subcommittee to continue support for IFAFS in the fiscal year 2002 appropriation at the level authorized by statute ($120 million).

ARS continues to address effectively many important research questions for American agriculture, ASPB commented. American farmers and consumers are well served by the large number of successful research efforts of ARS scientists, the Society said. Continued support for a balanced research portfolio in the department, including intramural and extramural research, is needed to address the many and sometimes devastating problems farmers face in growing crops.

ASPB noted its support for the request of the National Coalition for Food and Agricultural Research (National C-FAR) to double support for agricultural research over five years—a rate of increase averaging more than 14 percent a year.

ASPB noted that in the plant science area alone, extraordinary advances could be achievable with sufficient support and time. Increased funding can be expected to accelerate the time in which advances could be made. The age of genomics and biotechnology has brought revolutionary new tools to plant scientists to better serve the needs of agriculture, ASPB noted. The Society’s comments included projections of what may be expected to be achieved earlier or later in this new century depending on levels of support for research.

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Special Recognition for Dr. Ingo Potrykus at ASPB Annual Meeting

Dr. Ingo Potrykus will receive the ASPB Leadership in Science Public Service Award for his outstanding contributions to science and humanity at 6:00 p.m., Saturday, July 21, at the ASPB annual meeting in Providence. After receiving the award, Dr. Potrykus will be the featured speaker at the Perspectives of Science Leaders program beginning at 6:15 p.m. that same day.

Dr. Potrykus’s research interests include contributions to food security in developing countries through developing and applying genetic engineering technology to crop plants such as rice, wheat, sorghum, and cassava. He has been able to use biotechnology to address problems that have often been difficult to treat with traditional techniques in the areas of disease- and pest-resistance, improved food quality, increased yield, better use of natural resources, and improved biosafety.

In recent years, Dr. Potrykus’s research on golden rice with higher levels of beta carotene has generated significant interest in the science community and in the developing world as a promising, cost-effective way to prevent millions of cases of blindness among poor children with Vitamin A-deficient diets.

In the course of his distinguished career, Dr. Potrykus has published over 300 articles in refereed journals and has contributed to some 30 patents. He is a member of the Academia Europaea and recipient of the Kuntho Science International Award in Plant Molecular Biology and Biotechnology 2000.

Friendship Train Takes Biotech Program Conductor Siedow to Congressional Retreat at the Greenbrier

Although vigorous debate by elected representatives of the people with sincere differences of opinion over major issues of the day is a hallmark of our free and democratic society, it sometimes contributes to bruised relations among the participants. Historically, severe breakdowns in relations in Congress have contributed to the Civil War, with half a million casualties, and deadly duels between members of Congress.

Today’s Congress is a model of harmony compared to those earlier-day responses to serious disagreements. However, relations generally are viewed as being less congenial than they were some 20 years ago, when party leaders would emphatically state their differences on the House Floor during the day and then join in a friendly round of golf in the evening.

To help improve working relations between the parties, members of the House of Representatives hold a weekend retreat for each new Congress. On March 9, House Republicans and Democrats boarded a train from Washington, DC, to West Virginia for the House retreat at the Greenbrier Hotel and Resort in White Sulphur Springs.

Hopping right on board with them was ASPB Committee on Public Affairs member Jim Siedow of Duke University, Steve Case, CEO of America Online/Time Warner, Bill Hazeltine, chairman and CEO of Human Genome Sciences, and others. Case’s assignment was to discuss governance in the age of information technology. Hazeltine addressed genomics. And Siedow’s assignment was to discuss and respond to questions concerning crop biotechnology. He addressed two workgroup sessions on Saturday, March 10.

Two groups of about 15–20 members of Congress participated in the agricultural biotechnology sessions. One of the questions concerned Siedow’s view of the StarLink corn debacle. His response that production of corn not approved for human use was clearly an ill-advised corporate decision met with voiced agreement. Some of the other questions focused on the safety of modified crops and the labeling of genetically modified organisms.

This retreat was a rare opportunity to address many members of Congress at the same time on the issue of modified foods. It was Siedow’s third scheduled congressional briefing on plant biotechnology in the past year. The week before the Greenbrier retreat, he participated in a symposium on modified foods at the University of New Hampshire that was attended by several hundred students and teachers from the university, surrounding high schools, and community. The program ran the full day, from 9 a.m. to 4 p.m., with virtually all the attendees staying for the entire event. ASPB member Subhash Minocha of the University of New Hampshire helped organize and coordinate the program.

ASPB Book Program

ASPB welcomes proposals for its book program. Books typically published by the Society are edited, peer-reviewed works based on symposium proceedings and collections of mini-reviews. Topics include plant physiology, molecular biology, environmental biology, biochemistry, cell biology, biophysics of plants, regulation of gene expression, molecular and genetic basis of plant development, plant–microbe interactions, and molecular aspects of plant cell organization and function. Books must be timely and focused on a single topic. Proposals must demonstrate scholarship, good writing, and the potential to fill an existing need in the field.

To obtain more information on publishing books with ASPB, contact the publications director at 15501 Monona Drive, Rockville, MD 20855-2768 USA or e-mail nancyw@aspp.org.

ASPB News. Vol. 28, No. 3 • 21
ASPB at National Science Teachers Convention

ASPB and its membership continue to make a strong effort to reach out to K–12 teachers in a number of venues. Perhaps one the most successful has been the ASPB presence at the annual National Science Teachers Association National Convention. The 2001 meeting was held in St. Louis from March 22 to March 25. In attendance were 11,000 of the brightest and best of our K–12 science teachers from across the nation. Also present and, just as important for our outreach efforts, were regional and national science administrators and representatives. Contact with these enthusiastic teachers and administrators has a profound impact on the nature and content of science education in our schools.

Indeed, contact was the name of the game as the Education Booth shared by C-Fern and Wisconsin Fast Plants hosted well over 1,000 visitors during the three days of the convention, most of whom had an interactive experience with one or both exhibits. Excited teachers flocked to the Wisconsin Fast Plant (WFP) exhibit to build a butterfly emergence chamber in which they could observe the emergence of a cabbage white butterfly from its chrysalis during the convention. This feature was presented in conjunction with the newest Fast Plants activity, “Fast Plants and Its Butterfly,” an experimental system featuring both organisms. One encouraging development was the presence of butterfly pilot teachers who displayed their students’ work as they assisted at the booth.

C-Fern visitors walked away with a miniature germination and growth chamber where they could follow the development of Ceratopteris gametophytes and also observed a live demo of fern sperm motility and the effect of chemoattractants. Both exhibits featured other activities and demonstrations to entice and interest the visiting teachers, including the ever-popular “bottle-cap” miniature gardens. ASPB had a strong presence, and hundreds of our Principles of Plant Biology brochures, bookmarks, and posters were given away. Teachers were also directed to the Web sites of ASPB, Fast Plants, and C-Ferns for additional information and resources.

It can be difficult to assess the impact of a program on its intended target audience. Yet, clearly, at the NSTA convention, the contagious enthusiasm of the teachers for the ASPB-sponsored Education Booth bears witness to a strong, successful outreach effort. Moreover, the impact of this ASPB outreach can be judged by the number of teachers, school systems, and administrators that have adopted and adapted these plant systems for their K–12 science education programs. The scope and breadth of the contacts and the multipli-cative effect of interacting with so many of the “movers and shakers” in K–12 education at this convention cannot be underestimated.

ASPB and the WFP and C-Fern folks are to be applauded for supporting and presenting these exhibits, which have gone a long way to ensure that plants play a major role in K–12 science education, and should be encouraged to continue support for this very successful outreach effort.

Many thanks to the WFP staff for providing photos and background information for this story.
A Novel Approach to Incorporating Biotechnology in the Undergraduate Curriculum

One of the exciting possibilities afforded by advances in biotechnology is the opportunity to introduce this technology across the spectrum of fields in the undergraduate biology curriculum. From testing for the presence of genetically modified organisms (GMOs) in products, to marker-assisted selection in plant breeding, to determining genetic variability in salmon populations, a number of opportunities exist for bringing this technology into the curriculum.

My colleagues and I in the College of Science and Mathematics at Cal Poly San Luis Obispo have, with the support of a grant from the National Science Foundation and the Course, Curriculum, and Laboratory Improvement (NSF–CCLI) grant, developed a novel way to distribute the technology where it doesn’t work so well. With the goal of facilitating the incorporation of biotechnology into the undergraduate classrooms of diverse disciplines, we have created a novel Undergraduate Biotechnology Laboratory (UBL). Its infrastructure consists of an administrator, mobile laboratory, stationary laboratory, and undergraduate student technicians. Using this infrastructure, UBL develops specific exercises, trains faculty and students, and facilitates undergraduate research. Students are better prepared to enter this rapidly expanding area. And, because biotechnology continues to have an increasing impact on society as a whole, non-science majors benefit as well from this exposure. The following is an overview of the project.

Mobile Laboratory
Since many diverse biotechnology applications have common protocols and can often be divided into distinct steps, all the equipment and reagents necessary for a given step can be loaded onto a cart. As such, the cart appropriately loaded for a particular step serves as the module for that step. This module then can be wheeled to the laboratory—whether biochemistry, crop science, fisheries, or cell biology—where it is to be used. The most complex is the electrophoresis module, consisting of six gel boxes, three power supplies, an imagine capture system, pipetors, tips, a balance, a microwave oven, gloves, eye protection, and solutions on two carts. It serves class sizes of 24 students. Mobile modules, as opposed to the common situation where all the equipment is located in a single laboratory, permits simultaneous usage by different classes, makes equipment readily available, and makes more efficient use of both equipment and facilities.

Development of Course-Specific Exercises
Given our teaching loads, other obligations, and limited resources, it is often difficult for faculty to develop laboratory exercises with wet lab biotechnology applications, even if they have biotech experience. Thus, beyond equipment availability, faculty require assistance. UBL satisfies this need by adapting published protocols so as to create course-specific exercises for faculty. The following examples illustrate the utility of this approach.

The introductory biology course serves both majors and non-science majors, a large target audience of students. By adapting an experiment in human DNA polymorphism detection, we have introduced these students at the beginning of their college experience to the use of biotechnology in a direct way. The exercise has been adapted for simplicity and streamlining to accommodate large groups of students. It takes portions of four different laboratory sessions to complete the exercise, with each part of the exercise set up in a cafeteria-like manner with stations for each step. The steps are reinforced by faculty, teaching assistants, and informational guidance. Given these practices, over 90 percent of the students are successful in determining their genotype. Next year the laboratory is expected to expand to more than 2,500 non-science and science majors. This laboratory experience, especially for the non-science major, removes the mystique associated with biotechnology and promotes a science-literate citizenry.

The second example was developed working with Dr. Steinmaus in the Crops Sciences Department at Cal Poly. His weed science course was able to demonstrate that a recently discovered herbicide-resistant rye grass population was the result of a naturally occurring genetic variation and not a gene transfer from an herbicide-resistant transgenic plant containing a CaMV-driven EPSPS gene. This was a powerful exercise for the 35 undergraduate students enrolled in the weed science course and could not have been easily accommodated in the traditional laboratory set-up.

The stationary laboratory maintains a duplicate set of basic equipment such as a thermocycler, image capture system, and microfuge, as well as other equipment including a fluorescence imager and DNA sequencer. This equipment, in contrast to the mobile laboratory equipment, always remains in the stationary laboratory and supports exercise development and training. The stationary laboratory is staffed by trained undergraduate students who, under the supervision of UBL’s administrator, develop course-specific exercises. These student technicians also train both faculty and teaching associates. So far

continued on page 24
this year, they have trained seven faculty and 18 graduate students.

Undergraduate Research

The undergraduate student technicians and the stationary laboratory also provide the equipment and assistance for protocols that undergraduate students use in their research projects. There is quite a diversity of undergraduate research projects currently making use of UBL’s facilities. Examples of such activity include monitoring global marine bacterial/algal communities through time, detecting and characterizing a neurotrophin receptor gene in sea urchins, and transforming poplar trees with a monooxygenase gene.

Continued funding is critical for the success of the UBL. The enlightened administration has made a commitment to support the staffing of the stationary laboratory and continued commitment to biotechnology support. For long-term sustainability, a student fee-based support mechanism has been approved that is based on the complexity of the particular molecular applications carried out.

Although the implementation and logistics are still under development, it is clear that the UBL is a novel approach to broaden the outreach and appeal of science by creating new and exciting ways to establish, promote, and disseminate biotechnology education to students from all disciplines on a university campus.

Peter Jankay
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San Luis Obispo

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See You in Providence!
July 21–25, 2001

Waterplace Park and Riverwalk. Credit: Providence Warwick CVB.

WaterFire Providence. Credit: Providence Warwick CVB.
Folke Skoog

Folke Skoog, one of the foremost plant scientists of the 20th century, as well as the discoverer of a major new class of plant hormones, the cytokinins, died in Madison, Wisconsin, on February 15, 2001, at the age of 92. He had been in poor health for several years. Folke is survived by his wife, Birgit, his daughter, Karin, son-in-law David Shepard, and three teenage grandsons, all of Madison.

Folke was born on July 15, 1908, in Halland, Sweden. During a visit to California in 1925 as a high school student, he decided to stay in the United States and became a naturalized citizen in 1933. He graduated from the California Institute of Technology with a B.S. in chemistry in 1932. Also in 1932 he competed in the summer Olympics and placed fourth in the 1,500-meter race. He received his Ph.D. in biology at Caltech in 1936 for pioneering studies on auxin. Several members of the Caltech Biology Department became lifelong friends, including Kenneth Thimann, Johannes van Overbeek, Frits Went, and visiting scientist Boris Ephrussi. In 1937-1938, Folke held an NRC fellowship at the University of California at Berkeley, where he worked with the plant nutritionist Dennis Hoagland. During the next several years he held staff positions at Harvard University and The Johns Hopkins University. During World War II, he served for two years as a chemist and technical representative attached to the U.S. Army in Europe.

Folke arrived at the University of Wisconsin in the fall of 1947, a new associate professor in a botany department debilitated by the war years. He quickly developed personal relationships with members of the administration and leading figures on the agriculture campus, providing advice and establishing numerous collaborations, many of which ranged considerably beyond his primary research interests. For example, he provided vigorous leadership in a several-year study of the noxious algal blooms in the local lakes. The effect of this was to rejuvenate the department and give it campus leadership in basic research in the plant sciences.

It was clear from work in the late 1940s that there were plant growth substances yet to be discovered. In this quest for unknown growth factors, Folke and his students used excised tobacco pith tissues. They soon found that the cells failed to divide and grow unless some vascular tissue was left attached or an extract of it was added. This led to the detection of cell division activity in several natural products and to the isolation of “kinetin” from aged herring sperm DNA in 1954 by Carlos Miller, at the time a postdoc in Skoog’s laboratory.

Collaborative work between Skoog’s group and F. M. Strong’s laboratory in the Biochemistry Department at the University of Wisconsin led to the identification of kinetin as N6-furfuryladenine and to the synthesis of N6-benzyladenine and other compounds of related structure possessing similar biological activity; these were generically named cytokinins. Discovery of the cytokinins triggered a flood of publications from laboratories around the world. For more than 20 years, Skoog’s group also collaborated with University of Illinois chemist Nelson J. Leonard in synthesizing and testing hundreds of possible cytokinins and antagonists and in establishing the principles governing their structure-activity relationships.

Folke Skoog was also a pioneer in investigating how to control the formation of roots, stems, and leaves from undifferentiated cells in plant tissue cultures. He established that by manipulating the proportions of cytokinins and auxins in the culture media, the formation of organs from undifferentiated callus tissue could be controlled to a remarkable degree. His concept that regulatory control of plant development is exerted by the relative levels of hormones and other factors led to the modification of a number of physiological concepts and horticultural practices, and his demonstration that whole plants can be generated from cultured cells helped lay the groundwork for the production of transgenic plants and other advances in biotechnology. The 1962 Murashige & Skoog culture medium of defined composition designed for the optimal growth of plant tissues remains in widespread use.

I wish all my readers could have known Folke Skoog as we knew him in those early years at Wisconsin. With his overt energy and drive, his intensity and eagerness in research, and his warm personal interest in everyone around him, he drew us all into his circle. He was advisor, critic, advocate, and friend. It made no difference whether you were a student of his (and I was not), he treated you like one of his own. If Folke hadn’t seen you yet that day, he would look at you quizzically and ask how you were doing, and often would respond to your reply with a lightning-quick witticism, his good-natured banter conveying his genuine interest in your well-being. He was remarkably accessible and totally devoid of stuffiness. A graduate student could drop by his office any time and find a sympathetic ear and perceptive advice.

Folke’s graduate students over the years numbered at least 60, and postdoctoral associates more than 40, not including the numerous collaborations where he was actively engaged with other professors’ students. Afternoon coffee hours, with Folke presiding over much joshing, were highlights for his students and associates, and for him. What is most memorable about these is that many fascinating visitors, usually longtime friends of Folke, showed up at the coffee hour, giving us a once-in-a-lifetime chance to visit with them in an informal setting; Kenneth Thimann, Frits Went, Robert Emerson, Boris

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Ephrussi, and Sir Rutherford Robertson, to name several from the early years.

Both on and off campus, Folke's activities were extraordinarily varied and productive. He was on numerous national panels and study sections and was active in several scientific societies, serving eventually as president of five of them. With respect to ASPB, he was awarded the Stephen Hales Prize in 1954, served as president of the Society in 1957–1958, and received the Charles Reid Barnes Life Membership Award in 1970. He was elected to the National Academy of Sciences in 1956. Many other honors were to follow in later years, including memberships in foreign academies and several honorary degrees, culminating in the award of the National Medal of Science during a ceremony at the White House in 1991.

His leadership on the UW–Madison campus was manifested in ways that have had a lasting impact. For example, he was the initiator and prime mover in the establishment of the Biotron for the study of plants and animals under controlled environments. He was also the driving force behind the establishment in the mid-1960s of the highly successful Biocore program at Wisconsin. He argued persuasively that biology majors would be much better educated if they first received a grounding in physics and chemistry, and then, building on this foundation, took courses in biology in logical sequence.

In personality, Folke was a perceptive and stimulating companion, whose remarks even in casual conversation conveyed clarity and depth of thought. He was also known for his quick repartee and mordant comments. Thus, the reader may find it surprising that Folke, considering his own intellectual powers, was extraordinarily patient with and considerate of those occasional students of his who were only of modest ability. Folke's students bore a deep affection for him, and a large number of them wrote, called, or visited him and Birgit later in life. He and Birgit had scores of friends scattered around the world, many of whom were truly close friends. The Skoogs treasured their friends and kept in frequent touch by letter and phone.

Folke was exceedingly careful and rigorous in examining experimental data, using the data from his own lab and sensitivity to the growth of his tissue cultures to detect important clues for further research. As he himself put it modestly in an interview late in life, he had “a fairly long nose in smelling out problems, and blind perseverance in trying to bring matters to a conclusion.” Owing to his widely acknowledged insight into biological phenomena, high professional standards, incisive views, and leadership qualities, he exerted an exceptional impact on the course and quality of research in the plant sciences internationally for 50 years.

Eldon H. Newcomb
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University of Wisconsin–Madison
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Sir Rutherford Ness Robertson

ASPB member Sir Rutherford (Bob) Robertson, AC, KCMG, CMG, FAA, FRS, DSc, died on March 5, 2001. The president of the Australian Academy of Science, Brian Anderson, said “On behalf of the Australian Academy of Science, I express the sadness we all feel at the loss of a most distinguished colleague and friend. Professor Robertson played a leading role in the development of Australian science in the post-war period, through his research and personal leadership. He was an inspiring leader and colleague and will be greatly missed.” Bob Robertson was knighted in 1972 and became a companion of the Order of Australia in 1980. He was already a fellow of The Royal Society (London) and a foreign associate of the U.S. National Academy of Sciences.

Professor Robertson was born in Melbourne in September 1913. His father was a Baptist minister and his mother a science graduate with a natural curiosity. Bob suffered from polio in childhood. He attended schools in Melbourne and Christchurch, and in 1930 went to the University of Sydney, where he studied chemistry and botany. After graduation, a science research scholarship and a Linnean MacLeay Fellowship allowed him to continue research for three years. He won an 1851 Exhibition Scholarship to Cambridge University, where he studied ion absorption by plant tissues. During this period he married Mary Rogerson, and in 1939 he was awarded his Ph.D.

Robertson joined the Botany School of the University of Sydney in 1939 and collaborated with CSIRO scientists to study the storage and handling of fruit, combining basic plant physiology research with practical applications. In 1946, he transferred to CSIRO and negotiated with the Botany Department to pool resources; he established a joint Plant Physiology Unit within that department in 1952.

The basic aspect of active transport of charged molecules into plant cells was dominating his thinking, and he explored the connections between respiration and the active transport processes. He was convinced that charge separation across membranes was the manner in which the energy of respiration was stored. This basic idea has been developed further and has been established as the mechanism of energy conservation in respiration and photosynthesis (Robertson, 1955).
After a period (1959–1962) as a member of the executive of CSIRO, he returned to his own research as professor of botany at Adelaide University. In 1965, he was asked to establish and be part-time chairman of the Australian Research Grants Committee. He recognized the importance of the success of this committee to Australian science.

He was tempted back to Canberra in 1969 to become master of University House, pursuing his research by collaborating with A.N.U. scientists and becoming director of the Research School of Biological Sciences in 1973. He became president of the Academy of Science in 1970, having been elected a fellow soon after its formation in 1954.

After his retirement in 1978, Professor Robertson continued as deputy chair of the Australian Science and Technology Council and as pro-chancellor of A.N.U. He also continued his research at the University of Sydney and at CSIRO. He made lasting contributions to Australian science through his own research and his leadership of other researchers and by the influence he was able to exert within university and government administrations.

Bob Robertson played hockey as a youth and squash (before breakfast) in his later years. He enjoyed reading, horseback riding, and painting in watercolor. He wrote "How should I like to be remembered? Perhaps, if it is not too much, as a generous man, who, despite human failings, talked sense and occasionally showed signs of wisdom (Robertson, 1992)."

It was a pleasure and an honor to have known Bob Robertson and an absolute privilege to have been a student of such an inspirational and humane scientist. He is survived by his wife, Mary, and his son, Robert.

J. T. Wiskich, FAA
The Flinders University of South Australia, Adelaide


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ASPB News publishes dates, titles, locations, and contact names and addresses for meetings, courses, seminars, and the like that are of interest to ASPB members. Submit announcements via e-mail to sbbraxton@aspp.org or mail to Sylvia Braxton Lee, ASPB News, 15501 Monona Drive, Rockville, MD 20855-2768 USA. Faxed transmissions are not accepted.

2001

JUNE

June 19-29
Short Course: Postharvest Technology of Horticultural Crops
University of California, Davis
For information, contact Ms. Sharon Munowich, University Extension, University of California, Davis, CA 95616; telephone 530-757-8899, fax 530-757-8634, e-mail smunowich@unexmail.ucdavis.edu.

June 21-23
First European Allopathy Symposium
Physiological Aspects of Allopathy
Vigo, Spain
For more information, e-mail us at feas@uvigo.es or visit us at http://www.uvigo.es/feas.

June 23-27
XII International Conference on Arabidopsis Research
Madison, Wisconsin
Contact details to be provided by the North American Arabidopsis Steering Committee and posted at the TAIR Web site at www.arabidopsis.org.

JULY

July 1-4
Plant Growth Regulation Society of America
Wynndham Miami Beach Resort, Miami, Florida
Contact Dr. Gary Stutte, Program Chair, Dynacorn Corporation, Mail Code DYN-3, Kennedy Space Center, FL 32899; telephone 321-476-4319, fax 321-853-2839, e-mail gary.stutte1@ksc.nasa.gov, Web site http://www.griffin.peachnet.edu/pgrsa.

July 1-6
Gordon Research Conference on “Molybdenum and Tungsten Enzymes”
Queens College, Oxford, United Kingdom
Chairs: Dave Garner and Ralf Mendel. Detailed information about the conference can be found at http://www.grc.ox.ac.uk. For further information, contact Dr. Ralf Mendel at t.mendel@tu-bs.de.

July 3-12
Gordon Conference on “Gravitational Effects on Living Systems: Mechanosensing”
Connecticut College, New London
Chairs: Ruth Anne Eatock and Mike Gustin. Detailed information about the conference can be found at http://www.grc.ox.ac.uk/programs/2001/grav.htm. For further information, contact Mike Gustin at gustin@bioc.unc.edu.

July 8-12
The 6th International Symposium on Inorganic Nitrogen Assimilation
The Champagne Congress Centre
Reims, France
Information is available at http://www.inra.fr/Internet/Projets/eunia2001/ or e-mail hirel@inra.versailles.fr and lea@lancaster.ac.uk.

July 8-21
Plant Biochemistry Summer Course 2001
Institute of Biological Chemisty
Washington State University, Pullman
For information, contact Karen Maertens (maertens@wsu.edu) or visit the Institute of Biological Chemistry Web site at www.wsu.edu.

July 21-25
The Quadrennial Joint Annual Meetings of the American Society of Plant Biologists and the Canadian Society of Plant Physiologists (Societe Canadienne de Physiologie Vegetale)
The Rhode Island Convention Center
Providence
For more information, see http://aspp.org/annual_meeting/pb-2001/index.htm or contact American Society of Plant Biologists, telephone 301-251-0560, fax 301-279-2996, e-mail aspp@aspp.org.

July 22-24
International Symposium on Ecological and Social Aspects of Transgenic Forest Plantations
Skamania Lodge, Stevenson, Washington
Columbia River Gorge
Pacific Northwest United States
For information, contact Steve Straus@orst.edu or visit http://www.fsl.orst.edu/gerc/ifro2001/eco_symposium.htm.

July 22-27
Tree Biotechnology in the Next Millennium
Skamania Lodge, Stevenson, Washington
Columbia River Gorge
Pacific Northwest United States
For information, contact Steve Straus@orst.edu or visit http://www.fsl.orst.edu/gerc/ifro2001/.

July 25-30
The Fifth International Conference on Tetrapyrrole Photoreceptors in Photosynthetic Organisms
Brown University, Providence, Rhode Island
The meeting will follow the ASPB annual meeting, which is also being held in Providence. The chair for the conference is Samuel L. Beale, and the vice chair is Alfred Holzwarth. For more information, see http://www.brown.edu/Departments/Molecular_Biology/ICTPPO/.
July 28–August 2
XIV International Plant Nutrition Colloquium
University of Hannover, Hannover, Germany
Hosted by the International Council on Plant Nutrition, President W. J. Horst. The meeting will be followed by a two-day field trip.
Information on the program and how to register can be obtained from www.ipnc2001.uni-hannover.de.

AUGUST

August 4–8
Phytochemical Society of North America
“Phytochemistry in the Genomics and Post-Genomics Eras” Oklahoma City, Oklahoma
Contact the organizer, Dr. Rick Dixon, at radirox@noble.org or see the Phytochemical Society of North America’s Web site (www.psna-online.org) for details of the program and registration and abstract submission deadlines.

August 6–10
7th International Congress on Amino Acids and Proteins
Vienna, Austria
For information, contact Bijay K. Singh, BASF Corporation, PO Box 400, Princeton, NJ 08543-0400; telephone 609-443-8341, fax 609-275-5216, e-mail singhb@pt.cyanamid.com.

August 13–15
International Satellite Conference on “Chloroplasts: Development and Function”
New Delhi, India
The meeting is in conjunction with the XII International Photosynthesis Congress to be held in Brisbane, Australia, August 18–23, 2001.
Contact: Professor A. S. Raghavendra, Department of Plant Sciences, School of Life Sciences, University of Hyderabad, Hyderabad 500046, India; telephone +91-40-30106630, fax +91-40-3010145, e-mail assr@sohydernet.in, Web site http://www.geocities.com/satellitedelhi.

August 19–24
PLASMODESMA 2001
Cape Town, South Africa
Registration by June 2001

August 27–29
Symposium: Environmental Signalling: Arabidopsis as a Model
Utrecht University, Utrecht, The Netherlands
Organizers: Sjef Smeecken, Marcel Proveniers, Rens Voosenek, and Pieterse Corné. See the Web page for information and registration: http://www.bio.uu.nl/EFS-summerschool/

SEPTEMBER

September 2–7
9th Cell Wall Meeting
Toulouse, France

September 2–7
VIII Brazilian Congress of Plant Physiology (VIII CBFV)
"Physiology of Plants in the New Millennium: Challenges and Perspectives"
Ilhéus, Bahia State
For further details, contact Dr. Paulo Alvim (chair), VIII CBFV, telephone +55-73-214-3237, e-mail cbfv@cepec.gov.br. Also visit the Web site at www.uesc.br and www.cepec.gov.br.

September 5–8
The Fourteenth John Innes Symposium
Chromosome Dynamics & Expression
John Innes Centre
Norwich, Norfolk, United Kingdom
For information, contact Samantha Lingwood, Symposium Secretary, John Innes Centre, Norwich Research Park, Colney, Norwich, NR4 7UH, United Kingdom; telephone +44-1603-450000, fax +44-1603-450045, e-mail samantha.lingwood@bsbrc.ac.uk, Web site http://www.jic.bbsrc.ac.uk/events/symposium/.

September 7–12
Biological Significance of Type IV Secretion Processes
EuroConference on the Medical and Ecological Implications
Castelvecchio Pascoli, Italy
Deadline for applications is April 30, 2001. For information and application forms, contact the head of the EURESCO Unit, Dr. J. Hendenkovic, European Science Foundation, 1 Quai Lezay-Mareesia, 67080 Strasbourg, cedex, France; telephone +33-388-76-71-35, fax +33-388-69-87, e-mail eureesco@efs.org, Web site http://www.esf/eureesco.

September 12–15
Plant Protein Phosphorylation
Vienna, Austria
See the Web site at http://www.at.embnet.org/gem/plant/congress.htm for details.

September 17–18
Medicinal Compounds from Plants: Age-Related Disorders
Plant Protein Club
University of York, United Kingdom
For more information, see the Web site at http://www.york.ac.uk/pcg/events.htm#latest or contact the administrator at ppc@york.ac.uk.

September 26–30
WSES World Conference of Biosciences
Kavli Institutes, Skiathos Island, Greece
Organized by HIEST, Department of Electrical Engineering and Computer Science (http://www.workds.es/ws/es/conferences/skiathos/mcbt/). For more information, e-mail skiathos2001@worldes.org or skiathos2001@groupmail.com.

NOVEMBER

November 11–15
6th ISRR Symposium "Roots: The Dynamic Interface Between Plants and the Earth"
Nagoya, Japan
Organizers: Japanese Society for Root Research (JSRR) and International Society of Root Research (ISRR). For information, e-mail Dr. S. Morita at anatomy@mail.ecc.u-toyko.ac.ip or visit the Web site at http://www.soc.nacsis.ac.jp/jsrr/est/.

DECEMBER

December 4–6
International Symposium
“Irrigation and Water Relations in Grapevine and Fruit Trees”
Mendoza, Argentina

2002

MAY

May 20–22, 2002
Urban Agriculture: Emerging Opportunities in Science, Education, and Policy
Dallas, Texas
Contact 972-231-5362 for more information or visit http://urbanag.tamu.edu.
This form may be used only by members of the American Society of Plant Biologists. Please print or type your placement information on this form (curriculum vitae will not be accepted) and send to Donna Gordon, ASPB Headquarters, 15501 Monona Drive, Rockville, MD 20855-2768 USA; e-mail dgordon@aspp.org

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I am seeking the following position (check all that apply):

( ) Permanent ( ) Temporary ( ) Postdoctoral ( ) Industrial
( ) Academic ( ) Government ( ) USA only ( ) Outside USA

US citizen? ( ) Yes ( ) No Date available: __________

Fields of interest, specialties, and publications titles:

Thesis, dissertation topics, professor:

Professional societies and honors:

Degree/year Major Minor College/university and location

Postdoctoral study (specialty and with whom, where, and when):

Employer and location From To Position, title, and duties

References (names, addresses, and telephone numbers):

[Table with columns for each section mentioned in the form]
I. Registering with the ASPB Placement Service and Obtaining Placement Files

ASPB operates a placement service in which are kept active two files of resumes of individuals who are seeking employment. Employers are urged to survey the resume files for those seeking permanent positions and those seeking postdoctoral or similar positions. The files cost $25 each and may be ordered from Donna Gordon, ASPB Placement Service, 15501 Monona Drive, Rockville, MD 20855-2768 USA. Those seeking employment should complete the Placement Service Form on the previous page to be included in the service.

II. Placing a Position Ad in the ASPB News and on the ASPB Homepage

Submit all ads by e-mail to Sylvia Braxton Lee at sbraxton@aspp.org (or by mail to Sylvia Braxton Lee, 15501 Monona Drive, Rockville, MD 20855-2768 USA). If you are submitting a chargeable ad, please include billing information when you send the ad.

ACADEMIC/GOVERNMENT/INDUSTRY PERMANENT POSITIONS (Ph.D.)

Research Scientists/Laboratory Leaders
BASF Corporation
Research Triangle, North Carolina
(Received 03/06)
Dynamic. Exciting. Innovative. BASF Plant Sciences L.L.C. has brought the future of plant biotechnology to Research Triangle Park (RTP). Join us in one of our exceptional career opportunities. The ideal candidate will have a Ph.D. and one to three years of experience in biological or agricultural sciences with a focus on plant molecular biology or genetics and a background in plant physiology, plant abiotic stress, lipid metabolism, genomics, or crop transformation. Postdoctoral research is desirable, as is research from molecular to whole-plant level. Resumes can be faxed to 919-572-2319 or mailed to 26 Davis Drive, RTP, NC 27709.

Assistant Professor
Utah State University, Logan
(Received 03/22)
Utah State University seeks an individual to conduct research, mentor students, and teach in the area of plant-water relations. Whole-plant, biochemical, or molecular approaches may be used to carry out externally funded research, and some collaboration with existing programs will be expected. Teaching will include a graduate course in plant-water relations. This is an 11-month tenure-track position, requiring a Ph.D. in a relevant field. Review begins June 15, 2001. See http://personnel.usu.edu (2-105) for a full position description. Send cover letter stating research interests and goals, curriculum vitae, complete copies of transcripts, copies of recent publications, and names, addresses, e-mail addresses, and telephone numbers of four references to Dr. Jennifer MacAdam, Department of Plants, Soils, and Biometrology, 4820 Old Main Hill, Utah State University, Logan, UT 84322-4820. AA/EEO.

Assistant Professor
Cornell University, Geneva, New York
(Received 03/29)
As part of a genomics initiative, the Geneva campus of Cornell University in partnership with the Ithaca campus, the Boyce Thompson Institute for Plant Research, and USDA/ARS is soliciting applications from outstanding candidates for faculty and staff scientist positions in plant genomics. The appointees are expected to participate in a university-wide interactive team utilizing genomic approaches and, as appropriate, the latest techniques in biochemistry, genetics, analytical chemistry, and molecular and cell biology. Responsibilities: To develop an innovative program in genomics to examine the genetic and physiological bases of plant responses to their environment. Use of appropriate state-of-the-art structural and functional genomic, molecular, and biochemical tools is expected. The appointee will be expected to develop a program to examine the interaction of plant resistance genes with pest organisms and/or plant responses to specific abiotic stresses such as temperature extremes and adverse soil conditions. This position should have a solid grounding in botany, horticulture, or a similar field. Applicants should send curriculum vitae, statement of research interests, and names of at least three references to Search Committee.


Check ASPB’s Web site (http://www.aspp.org/job_bank/index.htm) every Friday for new job listings.

Jobs with early application deadlines are listed on the Web site but might not appear in the ASPB News.
Research Chemist (Plant Biochemist)
USDA/ARS, Madison, Wisconsin
(Received 04/02)
The U.S. Department of Agriculture, Agricultural Research Service, Cereal Crops Research Unit in Madison, Wisconsin, is accepting applications for a research chemist (plant biochemist) to investigate phytochemicals in cereal grains that may have health-promoting or disease-preventing properties. The successful candidate will be able to extract, identify, and characterize biologically active phytochemicals, such as antioxidants, using modern biochemical techniques, and will be able to characterize enzymes and pathways involved in synthesis of these compounds in developing or germinating grain. The incumbent will collaborate with unit scientists and others working to improve cereal germplasm for human food. A Ph.D. in biochemistry or a related field or equivalent experience is required. Salary range: $43,326 to $67,500 per year is commensurate with experience. Candidate must be a U.S. citizen. For more information about the research program, contact Dr. David M. Peterson, 608-262-4482, dmpeter@facstaff.wisc.edu. For a copy of the vacancy announcement and application forms, contact Jean Weinbrenner, 608-264-5357, jweinbr@facstaff.wisc.edu or visit Web site at http://www.ars.usda.gov/opportun.htm. Applications should be marked ARS-X1W-1228 and must be postmarked by June 4, 2001. USDA is an equal opportunity provider and employer. Women and minorities are encouraged to apply.

Environmental Physiologist
The Cranberry Experiment Station
University of Massachusetts, East Wareham
(Received 04/06)
The Cranberry Experiment Station at the University of Massachusetts located in East Wareham is seeking an innovative research scientist to provide research and extension support to the Massachusetts cranberry industry in the area of plant-environment interactions. Position is for assistant extension professor (non-tenure track; five-year renewable, 12-month appointment). Emphasis should be on whole-plant physiology, which may include one or more of the following areas in cranberry production systems; winter hardiness and cold-stress physiology, dormancy, water management and quality, factors limiting fruit set, anaerobic stress physiology, and rhizosphere physiology. Responsibilities include developing and maintaining an active research program, securing extramural funding, communicating effectively with diverse audiences, and producing extension and scientific publications. The successful applicant will have (1) a Ph.D. in plant physiology, horticulture, biochemistry, or related field and (2) postdoctoral and extension experience (preferred). Salary is competitive and based on experience and qualifications. For more information contact Hilary Sandler, (hsandler@umext.umass.edu or 508-295-2212, ext. 21). Application materials should be sent to the chair of the Search Committee with a priority deadline of July 1, 2001. Applicants should send letter of application, curriculum vitae, transcripts, and the names, addresses, fax, phone numbers, and e-mail addresses of three references to Chair, Environmental Physiologist search committee, Cranberry Experiment Station, PO Box 569, East Wareham, MA 02538. The University of Massachusetts is an AA/EEO institution. Women and members of minority groups are encouraged to apply.

Faculty Position
Clemson University, Clemson South Carolina
(Received 04/06)
The Department of Horticulture at Clemson University invites application for a tenure-track position, 50% teaching and 50% research, in turfgrass physiology and management. This nine-month tenure-track position will be at the assistant professor level. A Ph.D. in plant physiology, horticulture, agronomy, botany, molecular biology, or closely related area of plant science is required. Teaching responsibilities will include shared responsibilities for undergraduate Turf internship and seminar program and graduate courses in research systems and one in the candidate's area of expertise (e.g., turfgrass physiology). The successful candidate will develop an aggressive, grant-driven research program. Salary is commensurate with experience, and a full range of benefits is available. The position is available starting August 15, 2001. Applicants should submit a letter of application describing interests, experience, and qualifications; current curriculum vitae; transcripts; and names and contact information of three references to Dr. Ted Whitwell, Search Committee Chair, Department of Horticulture, Box 340375, Clemson University, Clemson, SC 29634-0375; telephone 864-656-4971, fax 864-656-4960, e-mail twhtwll@clemson.edu. Applications must be received by June 2, 2001, to receive full consideration. However, the position will remain open until a suitable candidate is found. Clemson University is an EO/AA employer.

Regional IPM Advisor—IPM Weed Ecologist
University of California, Parlier
(Received 04/18)
The University of California, Division of Agriculture & Natural Resources, Cooperative Extension is seeking a career-track academic candidate to initiate, coordinate, and/or conduct adaptive research projects and educational programs with the goal of implementing IPM for vegetation management systems on targeted crops. IPM programs will be conducted in the Central Valley Region on commodities where both significant knowledge and regional needs exist. Special emphasis will be given to enlisting the support of and coordinating pest management activities of UCCE Advisors and of Pest Control Advisors. A master of science degree is required, and a Ph.D. is desired in plant ecology, horticulture, weed science, botany, agronomy, plant physiology, or other plant science discipline, with emphasis in weed science. Several years of practical experience in pest management is desired. Beginning salary in the
Assistant Professor
University of Illinois at Urbana-Champaign
(Received 04/27)
Emphasis is on innovative extension and applied research. A nine-month tenure-track 70% extension/30% research position is available with opportunity for summer appointment. Develop nationally recognized extension/applied research program on management of weeds in field crops with emphasis on weed biology/ecology. Develop externally funded applied research program on integrated weed management strategies that are economically and environmentally sound. Collaborate with faculty, industry, and direct graduate student research. Ph.D. in weed science or closely related discipline is required. Research experience in a weed science specialty is highly desirable. Must possess excellent interpersonal and communication skills; demonstrate ability and desire to develop and deliver excellent extension programs; and demonstrate ability to conduct and report research. Salary is commensurate with training and experience. Starting date is January 1, 2002. Application deadline: September 15, 2001. Send cover letter, curriculum vitae, and statement of extension and research goals to Professor G. H. Heichel, Head, Department of Crop Sciences, University of Illinois at Urbana-Champaign, 1102 South Goodwin Avenue, Urbana, IL 61803; telephone 217-333-9480.
Applicants also must arrange to have a complete set of certified university transcripts and three letters of reference sent to address. Web site at http://www.cropsci.uiuc.edu. Please cite announcement number 04/01B-7673 when applying. EEO/ADA/AA employer.

Marine Molecular Biologist
University of Delaware, Lewes
(Received 04/27)
The Graduate College of Marine Studies and the Center of Marine Environmental Genomics at the University of Delaware invite applications for a tenure-track assistant professor or associate professor in the broad area of marine molecular biology. A Ph.D. is required. The position will be in the new Delaware Biotechnology Institute, Newark. The DBI will contain state-of-the-art genomic, proteomic, and bioinformatic capabilities, and it is expected that the candidate will develop a rigorous, externally funded research program that uses the new technologies in marine systems. The candidate will also develop close ties and collaborations with other members of the CMS faculty in Lewes, Delaware. Teaching responsibilities include contributions to integrated marine molecular biology/biochemistry courses and development of specialty courses within the candidate's field of interest. The start date for the position will be early 2002 and will include a competitive salary, start-up package, and new laboratory facilities. Review of applications will begin June 15, 2001, and continue until the position is filled. Applicants should submit curriculum vitae, statement of research goals and teaching philosophy, and full contact information for three references to J. S. Boyer, Chairman of Search Committee, College of Marine Studies, University of Delaware, 700 Pilottown Road, Lewes, DE 19958. The curriculum vitae and letters of reference shall be shared with departmental faculty. The University of Delaware is an equal opportunity employer that encourages applications from minority group members and women.

Plant Tissue Culture Scientist
(Received 04/30)
A Plant Tissue Culture Scientist is sought to develop and optimize regeneration protocols. Experience with recalcitrant and/or woody species desired. NovaFlora, Inc., is focusing on the development of ornamental plants through biotechnology. With a powerful toolbox of trait and enabling gene technology, we are well positioned to develop and commercialize a unique range of ornamental products. Through a licensing arrangement with Plant Bioscience Ltd. (John Innes Centre, UK), NovaFlora owns commercial rights for ornamental plants to GAI, Constats, and TFL genes from Arabidopsis. NovaFlora is using these genes to create novel dwarf ornamentals (GAI), plants with early flowering characteristics (Constats), as well as plants with altered plant architecture (CEN). Established in 1993, NovaFlora is a privately held company with a strong entrepreneurial spirit. As a part of our team, the applicant is expected to contribute to the scientific development and commercial success of NovaFlora. In addition to expertise in plant tissue culture and plant transformation, the applicant should be a multifaceted, highly motivated individual with excellent communication skills. E-mail applications to info@novaflora.com or mail to NovaFlora, Inc., 3401 Market Street, Suite 350, Philadelphia, PA 19104. Telephone inquiries welcome at 215-387-5060, ext. 204. See our Web site at www.novaflora.com.

Research Scientist
Valent BioSciences Corporation
Libertyville, Illinois
(Received 04/30)
Valent BioSciences Corporation is seeking a scientist to perform research that leads to the identification of new plant growth regulators and the improvement of performance of current plant growth regulator products. The principal responsibilities of this position are to (1) determine the effects of plant growth regulators on plant growth and crop productivity, (2) characterize uptake and transport of active ingredients, (3) develop methods to identify new uses and improve performance of products, and (4) prepare and present technical presentations and reports on research. Qualifications for this include a Ph.D. or an M.S. with two or more years of postgraduate experience in plant sciences such as horticulture, agronomy, or botany; a strong background in plant physiology, biochemistry, and instrumental analysis; demonstrated experience in experimental design and analysis of plant systems; and creative and innovative problem-solving skills. Experience in physical chemistry and industrial R&D is desirable but not required. The position is located in the Chicago suburb of Long Grove, Illinois. Contact Valant BioSciences Corporation, Human Resources, 870 Technology Way, Libertyville, IL 60048; fax 925-817-3073, e-mail vbc.humanresources@valent.com.

Faculty Positions—Plant Biology
Donald Danforth Plant Science Center
St. Louis, Missouri
(Repeat)
The Danforth Center announces positions for faculty at full, associate and assistant member levels to direct fundamental research programs. Seeking scientists with broad interests/training in at least two scientific disciplines and well-formed research programs that will benefit from interactions with scientists of other disciplines. Demonstration of prior/current support and of interdisciplinary research benefits. Up to 10 faculty appointments will be considered in structural biology, biochemistry, phytotechnology/nanotechnologies, genetics, cell biology, gene regulation, soil-plant interactions, molecular physiology, molecular plant pathology, and abiotic stress biology. Successful candidates are expected to develop collaborative research.
programs within the Danforth Center and/or with scientists at partner institutions. Send resume, brief description of research interests, reprints of three key publications, and names of three references to Ms. Billie Brooker, Human Resources, Donald Danforth Plant Science Center, 7425 Forsyth Boulevard, Campus Box 1098, St. Louis, MO 63105. Visit our Web site, www.danforthcenter.org, for more information. The Donald Danforth Plant Science Center is an equal opportunity/affirmative action employer and encourages applications from under-represented groups, including minorities, women, and people with disabilities.

POSTDOCTORAL POSITIONS

Postdoctoral Positions
University of Montreal and Concordia University, Montreal, Canada
(Received 03/02)
Two postdoctoral positions are available immediately. Appointments are available in the areas of DNA microarrays and defense signaling during embryogenesis and defense response in potato. The project involves the development of DNA microarrays for genes involved in the regulation of embryogenesis and for genes controlling the establishment of the defense response during P. infestans infection. Preference will be given to candidates having experience in DNA sequencing, gene cloning, or bioinformatics. The annual salary will be from $27,000 to $32,000 (CDN) depending on experience, and the initial appointment will be for one year, renewable for a total of three years. Please send (preferably by e-mail) curriculum vitae and contact information for three references to Dr. Daniel P. Matton, Institut de Recherche en Biologie Végétale, Department of Biological Sciences, Université de Montréal, 4101 Sherbrooke Street East, Montréal, QC, Canada, H1X 2B2; e-mail matton@irb.umontreal.ca.

Postdoctoral Scientists
BASF Corporation
Research Triangle, North Carolina
(Received 03/06)
Dynamic. Exciting. Innovative. BASF Plant Sciences L.L.C. has brought the future of plant biotechnology to Research Triangle Park (RTP). Join us in one of our exceptional career opportunities. A Ph.D. in biological or agricultural sciences with special experience in plant physiology, plant biochemistry, or plant molecular biology is required. In order to complement the individual research laboratories, experience in oil biosynthesis or stress tolerance is highly desirable. Resumes can be faxed to 919-572-2319 or mailed to 26 Davis Drive, RTP, NC 27709.

Postdoctoral Position
University of Guelph, Guelph, Ontario, Canada
(Received 03/22)
A postdoctoral position is available immediately. The Department of Plant Agriculture is the site of ongoing research on the development of plant mitochondrial transformation systems. Candidates should have a Ph.D. in plant biology, molecular genetics, or related fields. Experience in plant tissue culture or molecular genetics is required; demonstrated ability in both areas is preferred. Background in transformation systems, protoplast culture, mitochondrial genetics or LSCM is desirable. The position is for one year, renewable for a total of three years. Please send (preferably by e-mail) curriculum vitae and contact information for three references to Dr. David Wolyk, Department of Plant Agriculture, Bowey Building, University of Guelph, Guelph, Ontario, Canada, N1G 2W1; telephone 519-824-4120, ext. 3092, fax 519-767-0755, e-mail dwolyk@auguelph.ca.

Postdoctoral Position
Salem International University, Salem, West Virginia
(Received 03/28)
A postdoctoral position is available to transform wetland species with cloned genes to develop a model for the study of transgenic plant systems for enhanced phytoremediation of heavy metal contamination. The individual will develop Agrobacterium transformation and selection systems, regenerate transformants, assay for expression, and verify gene integration. Experience with Agrobacterium transformation is required. Strong background in molecular biology is preferred but not required. Send curriculum vitae including phone and fax numbers and e-mail address, English reprints of publications, unofficial transcripts, and the names, addresses, telephone numbers, and e-mail addresses of three references by mail or e-mail to Dr. Suzanne Rogers, Department of Bioscience, Salem International University, Salem, WV 26426-0500, telephone 304-782-3355, fax 304-782-3379, e-mail rogers@salemium.edu. EOE/AA.

Postdoctoral Research Associate
University of Massachusetts, Amherst
(Received 04/02)
A full-time, temporary, non-benefited postdoctoral research position is available to study the control of pollen tube growth. Particular attention will be given to the role of calcium and protons using intracellular ion imaging and extracellular ion flux analysis. Successful candidate will be expected to work independently but will have close colleagues with whom to interact. In addition, excellent equipment is available, including a fluorescence ratio imaging microscope and an ion selective vibrating microelectrode apparatus. Minimum qualifications: Ph.D. in cell biology, experience in fluorescence light microscopy, and an understanding of membrane physiology. Salary is commensurate with experience. Please send resume and three letters of recommendation to Search #R12519, c/o Lisa Barry, Biology Department, Morrill Science Center, University of Massachusetts, Amherst, MA 01003-5810. Review of applications commences April 23, 2001, and will continue until position is filled. The University of Massachusetts is an affirmative action/equal opportunity employer. Women and minorities are encouraged to apply.

Postdoctoral Position
University of Arkansas, Fayetteville
(Received 04/05)
A postdoctoral position is available immediately to study rice functional genomics related to disease resistance. The project will focus on dissecting jasmonic acid- and salicylic acid-mediated defense signaling pathways using stress-related cDNA microarrays and transgenic rice mutants. Candidates should have a Ph.D. with a strong background in plant molecular biology and/or molecular plant pathology. Previous experience in cDNA microarray technology is desirable. Please send a letter of application, curriculum vitae, and names of three references to Dr. Yinong Yang, Department of Plant Pathology, 217 Plant Science Bldg., University of Arkansas, Fayetteville, AR 72701; fax 501-575-7601, e-mail yiyang@uark.edu.

Postdoctoral Position: Molecular Biologist
University of Connecticut, Storrs
(Received 04/09)
Our current, NSF-funded research program primarily focuses on the molecular (structure:function) analysis of cloned ion channels. We have recently cloned members of a newly discovered class of plant transport proteins: cyclic nucleotide-gated K(Ca) channels. These ligand-gated channels are involved in signal transduction pathways. We have in hand several clones (there are 11 putative sequences identified in the Arabidopsis genome) that we express in both oocytes and HEK 293 cell cultures for electrophysiological analysis. Our structure:function work involves site-directed

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mutagenesis followed by electrophysiological (voltage clamp) analysis using heterologous expression systems. I seek a scientist trained in standard molecular biology protocols. Others in the lab will employ voltage clamp methods and use of PClamp for current analysis of the channels. The scientist joining our group can be trained here in oocyte preparation and use and animal cell culture and transformation. We have a state-of-the-art lab in our university's new Agricultural Biotechnology Research Complex and have ongoing collaborations with faculty in neurobiology and pharmacy. Contact Dr. Gerry Berkowitz, Department of Plant Science U-67, 1376 Storrs Rd., University of Connecticut, Storrs, CT 06269-4067; telephone 860-486-5940, e-mail gerald.berkowitz@uconn.edu.

Postdoctoral Position: Electrophysiologist University of Connecticut, Storrs (Received 04/09)
Our current, NSF-funded research program primarily focuses on the molecular (structure:function) analysis of cloned ion channels. We have recently cloned members of a newly discovered class of plant transport proteins: cyclic nucleotide-gated (KCa) channels. These ligand-gated channels are involved in signal transduction pathways. We have in hand several clones (there are 11 putative sequences identified in the Arabidopsis genome) that we express in both oocytes and HEK 293 cell cultures for electrophysiological analysis. Our structure:function work involves site-directed mutagenesis followed by electrophysiological (voltage clamp) analysis using heterologous expression systems. I seek a scientist trained in voltage clamp methods and use of PClamp for current analysis. The scientist joining our group can be trained here in molecular methods for DNA manipulation, oocyte preparation and use, patch recordings, and animal cell culture and transformation. We have a state-of-the-art lab in our university's new Agricultural Biotechnology Research Complex and have ongoing collaborations with faculty in neurobiology and pharmacy. Contact Dr. Gerry Berkowitz, Department of Plant Science U-67, 1376 Storrs Rd., University of Connecticut, Storrs, CT 06269-4067; telephone 860-486-5940, e-mail gerald.berkowitz@uconn.edu.

Postdoctoral Associate/Associate Scientist Torrey Mesa Research Institute San Diego, California (Received 04/25)
Torrey Mesa Research Institute (formerly Novartis Agricultural Discovery Institute, Inc.), a research institute of Syngenta Research & Technology, is one of the largest, single, fully funded research endeavors dedicated to agricultural genomics, consumer health, and post-genomics technology. As an innovative and team-oriented company, we develop and apply cutting-edge biotechnology to match genes with traits for improved agriculture products, including consumer and animal health products. We currently seek the following qualified individuals: A position is available immediately to study host-virus interactions and functional genomics. Requires Ph.D. and up to two years’ postdoctoral experience emphasizing molecular plant virology. Experience with recombinant plasmid construction, nucleic acid isolation and analysis, protein expression and purification, yeast two-hybrid screening, and Agrobacterium-mediated transformation required. Must be able to work in a team environment. Excellent communication and organizational skills are essential. Job Code: PDASY/HOU-ASPB. TMRI offers excellent compensation and a great benefits package, including 401(k) with match and immediate vesting. For confidential consideration, please send resume and cover letter indicating position of interest and salary history and expectations to Torrey Mesa Research Institute, Attn: HR/(Job Code), 3115 Merrifield Row, San Diego, CA 92121-1102; fax 858-812-1096. EOE.

Postdoctoral Research Associate The University of Turku, Finland (Received 04/26)
We are investigating the interactions of hormonal signaling and reactive oxygen species (ROS) in controlling plant cell death and defense responses. We have demonstrated the requirement and interactions for ethylene, jasmonate, and salicylate signaling pathways in ROS-dependent cell death using an Arabidopsis mutant rcd1 (Overmyer et al., Plant Cell 12, 1849–1862; 2000). A two-year postdoctoral position is available to investigate the molecular basis of RCD1 function and to participate in the screening and genetic analysis of rcd1 suppressor mutants. Ph.D. degree from a suitable field and a strong background in molecular biology, biochemistry, and plant physiology are required. Prior experience with Arabidopsis is preferred. The position will be filled at the earliest August 1, 2001, and at the latest January 1, 2002. The salary is between 2000 and 2500 Euros/month depending on qualifications and previous experience. To apply, please send curriculum vitae, description of research experience, and the names and addresses (including e-mail addresses) of three references to Prof. Jaakko Kangasjarvi, Laboratory of Plant Physiology and Molecular Biology, Department of Biology, University of Turku, FIN-20014 Turku, Finland. More information is available at www.biocent. helsinki.fi/BIFsiouv, by e-mail jaakko. kangasjarvi@helsinki.fi, or by phone +358-40-720-8993.

RESEARCH/TECHNICAL POSITIONS
(Non-Ph.D.)

Research Associates BASF Corporation Research Triangle, North Carolina (Received 03/06)
Dynamic. Exciting. Innovative. BASF Plant Sciences L.L.C. has brought the future of plant biotechnology to Research Triangle Park (RTP). Join us in one of our exceptional career opportunities. A B.S. or an M.S. in biotechnology, molecular biology, or an agricultural science is required. At least two years (M.S.) or four years (B.S.) of relevant experience will be a plus. Experience in at least one of the following areas is required: growth and maintenance of plants in growth chamber/greenhouse, plant cell and tissue culture, plant transformation, analysis of transgene expression, RNA extraction, cloning, PCR, sequencing, production of microarray slides, data capture and analysis, enzyme assays, protein analysis, immunological techniques, HPLC, liquid handling systems, high-throughput biology would be of particular relevance. Resumes can be faxed to 919-572-2319 or mailed to 26 Davis Drive, RTP, NC 27709.

High-Throughput Process Developer BASF Corporation Research Triangle, North Carolina (Received 03/06)
Dynamic. Exciting. Innovative. BASF Plant Sciences L.L.C. has brought the future of plant biotechnology to Research Triangle Park (RTP). Join us in one of our exceptional career opportunities. A position is available for a laboratory leader and research associate with experience relevant to engineering high throughput molecular biology for implementation of robotic systems to achieve high levels of throughput and accuracy. The engineer should have experience with liquid handling systems, programming of automation, and high-throughput process development and familiarity with molecular processes. Resumes can be faxed to 919-572-2319 or mailed to 26 Davis Drive, RTP, NC 27709.

Bionformatician
BASF Corporation
Research Triangle, North Carolina
(Received 03/06)

Dynamic. Exciting. Innovative. BASF Plant Sciences L.L.C. has brought the future of plant biotechnology to Research Triangle Park (RTP). Join us in one of our exceptional career opportunities. A computational biologist is sought to mine and integrate gene sequence, gene expression, gene mapping, and metabolic profiling data for discovery of trait associated genes. Another computational biologist is sought who will develop and manage systems for tracking sample and data flow through genomic processes. The candidate should have a B.S., an M.S., or a Ph.D. Successful candidates will have strong communication skills, demonstrated creativity and leadership skills, and the ability to work with teams. Resumes can be faxed to 919-572-2319 or mailed to 26 Davis Drive, RTP, NC 27709.

Assistant/Associate Scientist
GenApps, Inc., Winchester, Kentucky
(Received 04/05)

GenApps, a company dedicated to serving the needs of agriculture, has a position immediately available for an associate scientist located in our Winchester, Kentucky, facility. The qualified applicant should possess an M.S. or a B.S. with three to five years of relevant working experience in biology/molecular biology, agricultural science, or a related field. Three years of laboratory experience emphasizing molecular biology required. Strong knowledge of and outstanding skills in a wide range of recombinant DNA techniques, gene expression systems, enzyme activity assays, and plant tissue culture is desired. Qualified applicant must be able to provide technical support under minimum supervision by planning and implementing individual duties and participating in interdisciplinary projects in support of overall company objectives. Must possess accurate oral and written communication skills, math knowledge associated with technical problems, computer capability, and the ability to perform assigned duties in varied environments including laboratory, greenhouse, and field. Responsibilities will include, but are not limited to, conducting assigned projects to meet department goals and providing assistance to scientists to initiate new projects. We offer competitive wages, excellent company benefits, and the opportunity to become part of a dynamic organization. If you meet the above qualifications and wish to explore this opportunity further, please send your resume with salary history/requirements and references to Human Resources Coordinator, GenApps, Inc., 4262 Colby Road, Winchester, KY 40397. EEO/AA/V/V/D.

Research Assistant
The Samuel Roberts Noble Foundation, Inc.
Ardmore, Oklahoma
(Received 04/19)

Applications are sought to fill a research assistant position with the Plant Biology Division at the Noble Foundation, Inc. A B.S. or an M.S. in cell/molecular biology, plant sciences, or related field is required. Experience in one or more of the following is desired: (1) Light and/or electron microscopy, (2) confocal microscopy and computer-based image analysis, (3) molecular cloning and plant transformation techniques, and (4) immunological techniques. The successful candidate will be involved in research that employs a wide range of microscopy and imaging techniques for basic studies in plant cell biology. Salary ($28,000-$39,200) is commensurate with experience and includes a comprehensive benefits package. Application and job description are obtainable from the Noble Foundation Web site, www.noble.org. Send complete curriculum vitae (including education, related-job experience, or list of courses taken) and names and contact information of three professional references to Jane Nance Human Resources—PLTBI030700-EB147, The Noble Foundation, PO Box 2180, Ardmore, OK 73402; telephone 580-223-3810, fax 580-221-7362, e-mail NFHR@Noble.org. Informal inquiries can be made to Dr. Elison B. Blanchard at 580-221-7364 or elb1@noble.org.

Entry-Level Technician
The Ohio State University, Wooster
(Received 04/24)

An Arabidopsis/plant molecular biology lab is seeking an entry-level technician. The available position of research assistant 1 is in the Department of Horticulture and Crop Science at The Ohio State University/Ohio Agricultural R&D Center located in Wooster, Ohio. The successful candidate will be a key player running a lab where the research goals are to understand plant transcriptional and environmental stress adaptation mechanisms. This is a permanent, hard money-funded position; starting salary range is $19,011–$23,856 with a full OSU benefits package. Higher salary commensurate with the qualifications/experience will be considered but will require prior college approval. Minimum qualifications are a B.S. degree in molecular biology/genetics, biochemistry, or related field. Knowledge of, and proven lab experience with, molecular biological techniques are essential. A desire and willingness to learn unfamiliar techniques are also critical. This includes manipulation of DNA, RNA, and proteins from yeast, plants, and E. coli and other bacteria; handling of phages and plasmids; and creation/analysis of transgenic plants. Other responsibilities will include overseeing and maintaining daily lab operating functions—i.e., ordering supplies, maintaining equipment, and assisting students/other researchers. To apply, send a cover letter, a detailed curriculum vitae or resume, and the names and contact information of three references to Dr. Eric Stockinger, The Ohio State University/OARDC, Department of Horticulture and Crop Science, 1680 Madison Avenue, Wooster, OH 44691; e-mail stockinge.r@osu.edu. The Ohio State University is an equal opportunity/affirmative action employer.

Research Specialist
University of Illinois, Chicago
(Received 04/30)

A research specialist is needed in a new stable isotope laboratory at the University of Illinois at Chicago. The laboratory, equipped with a Finnigan GC Delta XL and all necessary supporting equipment (EA, GC, GasBench II) is set for isotope applications in plant, ecosystem, and global change research. The successful candidate will assume management of the IRMS lab, operation, maintenance, training of users, and quality control. Opportunity exists to participate and develop research projects related to the lab interests. The lab is included in a larger multidisciplinary IRMS facility providing isotope ratio analysis of C, N, O, H, Cl, and S from biological, geological, and hydrological samples. Qualifications are at least a B.S. in biology, geology, chemistry, environmental science, or related discipline preferred with two or more years of experience in IRMS. Salary is negotiable and will be commensurate with
experience. To apply send a cover letter detailing previous experience and research interests, curriculum vitae, and names and addresses (include e-mail) of three references to Miquel Gonzalez-Mecer, IRMS position, Department of Biological Sciences, University of Illinois, 843 W. Taylor St., Chicago, IL 60607; telephone 312-355-3928, fax 312-413-2433, e-mail mmeler@uic.edu. Review of applications will begin June 1, 2001, and continue until position is filled. UIC is an AA/EEO employer.

Research Scientist
Valent BioSciences Corporation
Libertyville, Illinois
(Received 04/30)
See complete description on page 34.

ASSISTANTSHIPS, FELLOWSHIPS, INTERNSHIPS
Postdoctoral Fellow, Graduate Assistantship
and Technician Positions
Rutgers University
New Brunswick, New Jersey
(Received 04/26)
In Vivo Imaging of Chromatin Organization and Dynamics by GFP-Tagging. Several postdoctoral fellow, graduate assistantship, and technician positions are immediately available to join the team of researchers at Rutgers University and Cold Spring Harbor Laboratory to study chromatin organization in Arabidopsis. This is an NSF funded project with five years of funding that aims to completely chart the 3-D structure of interphase nuclei in a living plant. By using a wide field fluorescence deconvolution microscopy, we have successfully adapted the Green Fluorescent Protein to visually track specific insertion sites that were introduced into the Arabidopsis genome. Using multiple spectral variants for GFP, we plan to generate a large number of dispersed insertion lines that should allow us to produce a global map of the relative positions between different points in the genome. More complete description of our project can be found at the Web site http://www.fastlane.nih.gov/servlet/showaward?award=0077617. Postdoc fellowship applicants must be motivated and have good training in molecular techniques. Computer skills and knowledge of microscopy are highly desirable. We seek interactive, self-motivated individuals who work well in a team environment and are enthusiastic about interdisciplinary research. Stipend is commensurate with experience and demonstrated abilities. Interested individuals should contact Dr. Eric Lam, Biotech Center, Rutgers University, New Brunswick, NJ 08903; e-mail Lam@aesop.rutgers.edu.

Graduate Research Assistantship
Rutgers University, New Brunswick
New Jersey
(Repeat)
For information, contact Dr. B. Huang, Department of Plant Science, Rutgers University, New Brunswick, NJ 08901; telephone 732-932-9711, ext. 302, e-mail huang@aesop.rutgers.edu. (Details March/April ASPB News)

Fellowships
The Volcani Center, Bet Dagan, Israel
(Repeat)
For information, contact Dr. Susan Lurie, Department of Postharvest Science, The Volcani Center, ARO, POB 6, Bet Dagan 50250, Israel; fax +972-3-9683622, e-mail zelov@netvision.net.il. Additional information about the department can be found at http://www.agri.gov.il/Departments/Postharvest.html. (Details March/April ASPB News)

Ph.D. Graduate Research Assistantship
Simon Fraser University
British Columbia, Canada
(Repeat)
Contact: Dr. Aine L. Plant, Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia V5A 1S6, Canada; telephone 604-291-4461, fax 604-291-3496, e-mail aplant@sfu.ca, Web site http://www.sfu.ca/biology/faculty/plant/. (Details March/April ASPB News)

Graduate Assistantships
University of Florida, Gainesville
(Repeat)
Contact Dr. D. J. Huber, Graduate Coordinator, Horticultural Sciences Department, PO Box 110690, University of Florida, Gainesville, FL 32611-0690; telephone 352-392-1928, ext. 216, e-mail igoetz@ufl.edu. (Details March/April ASPB News)

Graduate Research Assistantship
North Carolina State University, Raleigh
(Repeat)
For additional information contact Dr. John Williamson at 919-515-5366, e-mail john_williamson@ncsu.edu. Formal admission requirements, forms, and deadlines can be found on the NCSU Graduate School Web site at http://www2.acs.ncsu.edu/grad/. Additional departmental admissions information may be obtained by contacting Dr. Stewart Warren, Graduate Program Coordinator, Department of Horticultural Sciences, North Carolina State University, Raleigh, NC 27695-7609 or by visiting our departmental Web site at http://www.cals.ncsu.edu/hort/scv/. (Details March/April ASPB News)

Ph.D. Graduate Assistantship
Purdue University, West Lafayette, Indiana
(Repeat)
Interested applicants should contact Anges Murphy, Department of Horticulture, 1165 Horticulture Bldg., Purdue University, West Lafayette, IN 47907-1165; telephone 765-496-7936, e-mail amurphy@hort.purdue.edu. (Details March/April ASPB News)

Ph.D. Graduate Research Assistantship
Purdue University, West Lafayette, Indiana
(Repeat)
For information contact Matt Jenkins, Department of Horticulture, 1165 Horticulture Bldg., Purdue University, West Lafayette, IN 47907-1165; telephone 765-496-1332, e-mail jenkins@hort.purdue.edu. (Details March/April ASPB News)

Graduate Research Assistantships
Louisiana State University, Baton Rouge
(Repeat)
Contact Dr. Norimoto Murai, Department of Horticulture and Crop Physiology, Louisiana State University and LSU Agricultural Center, Baton Rouge, LA 70803-1720; telephone 225-578-1380, fax 225-578-1415, e-mail nmurai@lsu.edu. (Details March/April ASPB News)

M.S. Graduate Positions
Salon International University, Salem
(Repeat)
Contact Dr. S. Rogers, Department of Bioscience, Salem International University, Salem, WV 26426-0500; telephone 304-782-5385, fax 304-782-5799, e-mail Rogers@Salenius.edu. EOE/AA. (Details March/April ASPB News)

Research Assistantships
University of Arkansas, Fayetteville
(Repeat)
Contact Dr. Yinong Yang, Department of Plant Pathology, 217 Plant Science Building, University of Arkansas, Fayetteville, AR 72701; telephone 501-575-5625, fax 501-575-7601, e-mail yiyang@uark.edu. (Details March/April ASPB News)

Graduate Research Assistantship
Texas A&M University, College Station
(Repeat)
Contact Dr. Keyan Zhu-Salzman, Department of Entomology, Texas A&M University, College Station, TX 77843-2475; e-mail kzas@tamu.edu. (Details March/April ASPB News)
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(Rev. 5/01)
For your convenience, keep this listing of extension numbers and e-mail addresses handy when you contact ASPB headquarters so that you can reach the person best able to assist you. Our office telephone number is 301-251-0560.

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